November/December 1980

Chilton's

TRUCK & OFF-HIGHWAY INDUSTRY

Special Report: Terex Weds IBH

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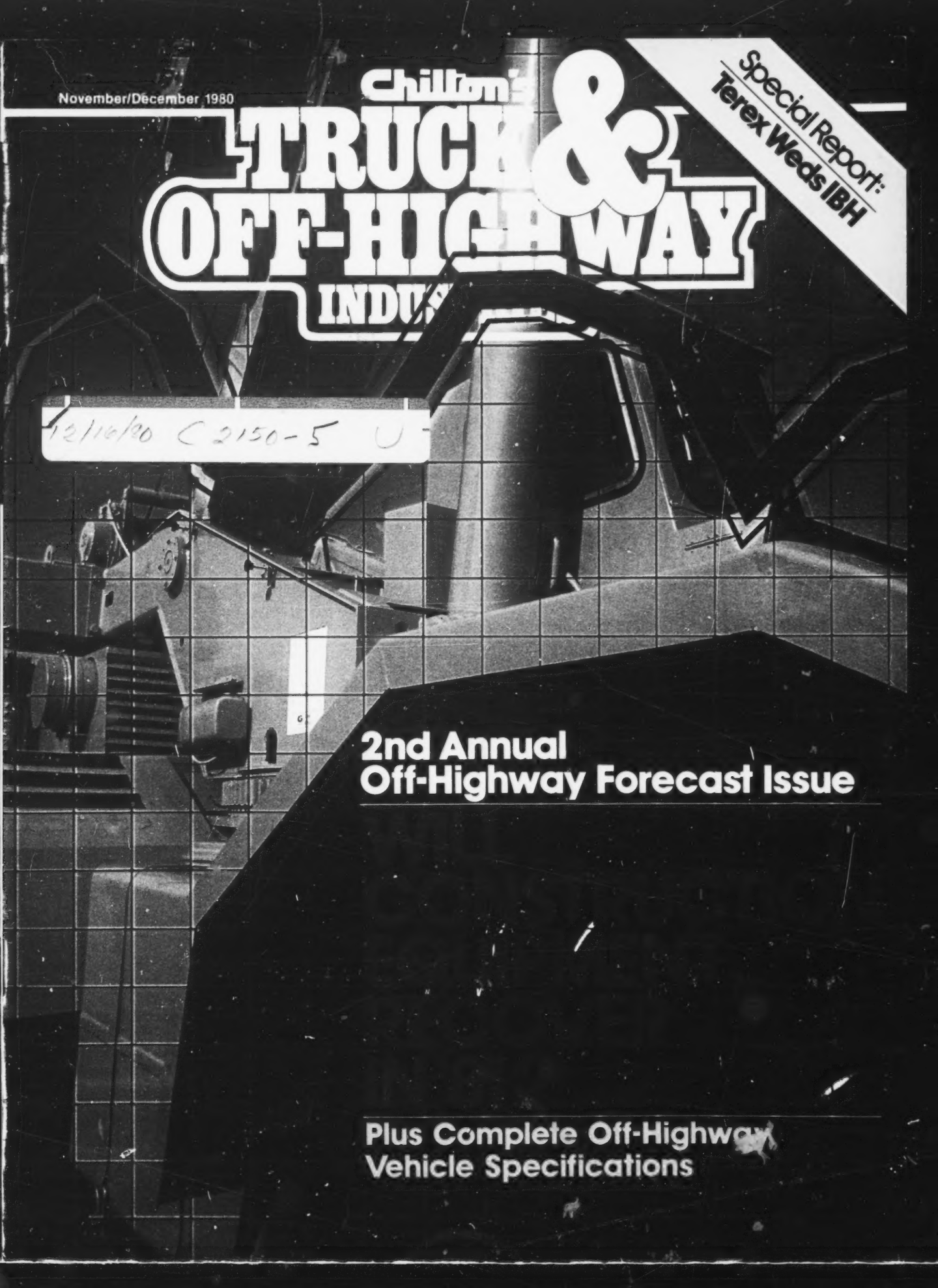

2nd Annual Off-Highway Forecast Issue

Plus Complete Off-Highway Vehicle Specifications

November/December, 1980
Volume 2 Number 7

Chilton's TRUCK & OFF-HIGHWAY INDUSTRIES

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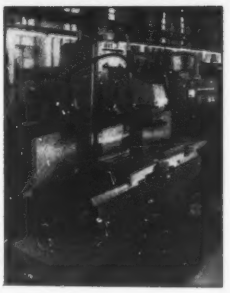
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cover

The ups and downs of the construction equipment market are dramatically shown on our special Forecast Issue cover.

TRUCK & OFF-HIGHWAY INDUSTRIES (USPS 461-290) magazine is published bimonthly (Jan/Feb, Mar/Apr, May/June, July/Aug, Sept/Oct, Nov/Dec) by Chilton Co., Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies Inc., New York, NY. Subscription prices: 1 year, $20.00 in United States, $30.00 Canada, and Foreign $40.00 per year. Air rates on request. Single copies and back issues on request. All subscription orders must be accompanied with cash or check along with complete information for classification, including title of the individual and the product the company manufactures. Controlled circulation postage paid at Philadelphia, PA 19104 and Salisbury, MD 21801. POSTMASTER: Send address changes to TRUCK & OFF-HIGHWAY INDUSTRIES P.O. Box 2055, Radnor, PA 19089. ©Chilton Company, 1980.

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INTERVIEW
Carl Macho talks to Camelback

According to TOHI's 1981 Off-Highway Forecast, a turnaround looms for domestic production of construction equipment.

by John A. Stark

This year's sharp downturn in business for builders of construction equipment finally has hit rock bottom. Partial recovery is expected in 1981.

According to an exclusive composite recently developed by *Truck & Off-Highway Industries*, domestic shipments of off-highway machinery in 1981 should jump by at least 10% to $12 billion or more.

However, a slump in international deliveries may continue through mid-year, offsetting positive domestic growth for manufacturers which cater heavily to international markets.

TOHI has been assembling a comprehensive 1981 composite of the industry since mid-1980. It's tied to key economic and industry variables, construction machinery statistical trends and outlooks obtained from officials who represent the gamut of the OEM business.

Subsequently, *TOHI* estimates that 1981 domestic deliveries of light construction and industrial vehicles will rebound 13.8% to $9.1 billion; road-building machinery will drop a modest 6.6% to $710 million; and heavy surface mining equipment will nudge ahead 1.8% to $2.21 billion.

Credit for this partial recovery in shipments for the three classifications of construction machinery can be claimed by the start of an upturn in another business cycle. Just recently, a two-year slide in business bottomed out when some key vehicle shipments started a slow but genuine recovery.

Industry wide shipments of industrial wheel tractors, for example, already have started to improve, following a 41% plummet in retail sales during the first quarter of this year. (See *TOHI*, July/August '80, p. 31.)

Similar patterns are also developing elsewhere. Shipments of crawler tractors and wheel loaders, for instance, are now beginning to show signs of life once again after tailspinning earlier this year. It's important to remember that crawler tractors, wheel loaders and industrial wheel tractors represent more than 75% of total industry production output each year.

According to the U.S. Dept. of Commerce, the nation should close out the year with new single and multi-family housing starts plugging along at an annual pace of 1.19 million units. This represents an upturn from 920,000 annual starts earlier this year, but is nowhere near 1979's impressive finish of 1.7 million starts.

Several industry experts foresee anywhere from 1.4 to 1.8 million starts in 1981, while the Commerce Dept. told *TOHI* it envisions about 1.55 million units started during the same period. Most agree that a pent-up demand for new housing is ready to explode again—once the Federal Reserve Board relaxes its restrictive monetary policy and allows natural forces of supply and demand within the free market system to take over.

Some industry analysts and even an insider at the Commerce Dept. point to the possibility of a sharp turnaround in the latter part of 1981, once subsidization of middle income housing is kicked into high gear by the federal government.

Consensus around the construction equipment OEM business is this: light construction and industrial machinery should track the nation's upturn in domestic housing starts. Thus, *TOHI* estimates a 13.8% rebound in off-highway shipments.

Case's J. K. Green, president and chief executive officer; Deere's C. B. Reynolds, vice president-marketing, Industrial Equipment Div.; and International Harvester's J. E. Monge, vice president-marketing, Construction Equipment Group foresee anywhere from a 10% decline to a 10% jump in industrial wheel tractor shipments.

The outlook is rosier for crawler tractors, wheel loaders, excavators and skidders. Case, Deere and IH envision the industry increasing performance levels in deliveries up to 10% next year. Crawler loaders may register anywhere from a 5% decline in shipments to a 10% recovery over 1980 output levels.

Crawler tractor sales are expected to post a 1981 increase of nearly 1760 units to 15,360; crawler loaders should show slow growth of just 375 deliveries to 4150 units;

TOHI *estimates that 1981 domestic deliveries of light construction and industrial vehicles will rebound 13.8% to $9.1 billion.*

Construction OEMs look for crawler tractor sales to gain traction in '81.

DOMESTIC OFF-HIGHWAY BUSINESS RECOVERS IN 1981
(Factory Shipments in Millions of 1980 Constant Dollars)

	1979	1980	1981	PERCENT CHANGE 1980–1981
CONSTRUCTION AND INDUSTRIAL VEHICLES	$12,340	$ 8,000	$ 9,100	+13.8
% OF TOTAL	79.1	73.2	75.7	
ROADBUILDING EQUIPMENT	$ 1,130	$ 760	$ 710	–6.6
% OF TOTAL	7.2	7.0	5.9	
MINING EQUIPMENT	$ 2,140	$ 2,170	$ 2,210	+1.8
% of TOTAL	13.7	19.8	18.4	
TOTAL ALL EQUIPMENT	$15,610	$10,930	$12,020	+10.0

DOMESTIC RETAIL SALES CLIMB IN '81 (UNITS)

TYPE OF EQUIPMENT	1979	1980	1981
CRAWLER TRACTORS	18,100	13,600	15,360
CRAWLER LOADERS	6,860	3,775	4,150
WHEEL LOADERS	16,490	12,360	14,000
CONVENTIONAL SCRAPERS	1,500	800	880
MOTOR GRADERS	5,800	4,930	4,685
REAR DUMP TRUCKS	1,720	946	1,040
BOTTOM DUMP TRUCKS	100	55	60
SKIDDERS	4,255	2,341	2,575
IND. WHEEL TRACTORS	45,000	29,250	32,175
HYDRAULIC EXCAVATORS	4,700	3,055	3,210

Source: Truck & Off-Highway Industries Data

wheel loaders may spurt forward by 1640 units to a finale of 14,000 vehicles; skidders could close 1981 books with an increase of only 234 units to 2575 machines; industrial wheel tractors are pegged for a comeback of 2925 deliveries to 32,175; and hydraulic excavators may advance by just 155 units to 3210.

For roadbuilding-type equipment used in highway construction and other public construction activity such as sewer and water projects, a modest 6.6% decline in unit deliveries is expected during 1981.

Cutbacks in federal spending are blamed for the negative growth within this once-prosperous sector of the construction machinery business. Compounding the dilema is an on-going depletion of the sacred federal highway trust fund, obtained from fuel tax—now lessened by fuel-stingy autos.

Several government insiders indicate that a change in the government's fuel tax structure may be instigated soon. And although Congress is considering an economic recovery proposal which may very well partially focus on stimulating expenditures for new highway construction, there's normally a 12-month lead time between proposal and implementation. So a hefty boost in 1981 highway construction outlays by the Federal Highway Administration appears remote.

Preliminary data from the Commerce Dept. confirm this assessment. Federal expenditures for highway construction show flat growth for 1981, tallying $17.8 billion—an unadjusted (for inflation) rise of 15% over 1980 expenses of $15.5 billion.

For other federally-funded public construction activity (dam building, land improvement, sewer and water projects and sanitary landfills), flat growth is anticipated next year as well. Outlays should rise to $18.2 billion—barely keeping pace with a 15% inflationary rate—following an estimated tally of $16.08 billion in 1980.

Consequently, Deere's Reynolds anticipates that shipments of mid-size scrapers and graders will slump 5%-10% next year. Conversely, IH's Monge pegs growth for deliveries of off-highway haulers and scrapers at 5%-10%.

According to *TOHI's* composite of the construction equipment industry for 1981, off-highway trucks should post growth of just 100 units to 4685 shipments; and conventional scrapers may jump by 80 units to 880.

For heavy surface mining machinery, a continued slow but steady growth is clocked for the industry. It's the sole segment of the business that's not recession-related—*TOHI* estimates a modest rise of 1.8% in off-highway shipments.

According to the federal government, 1981 may witness a 5% boost in production of domestic coal both below and above the surface. About 775 million tons are scheduled to be mined this year, of which 42% will be removed by surface mining

OEMs VIE FOR BIGGER SHARE OF CONSTRUCTION EQUIPMENT MARKET

CRAWLER TRACTORS (DOMESTIC UNITS)

	1979 RETAIL SALES	ESTIMATED MARKET SHARE
CATERPILLAR	8,680	48%
JOHN DEERE	3,800	21%
J.I. CASE	2,540	14%
INT'L HARVESTER	1,450	8%
FIAT-ALLIS	900	5%
KOMATSU	250	2%
TEREX	240	1%
MASSEY-FERGUSON	240	1%

WHEEL LOADERS (DOMESTIC UNITS)

	1979 RETAIL SALES	ESTIMATED MARKET SHARE
CATERPILLAR	5,935	36%
INT'L HARVESTER	2,310	14%
CLARK	1,815	11%
JOHN DEERE	1,650	10%
J.I. CASE	1,650	10%
FIAT-ALLIS	1,320	8%
FORD	825	5%
TEREX	329	2%
MASSEY-FERGUSON	329	2%
EATON-YALE	328	2%

INDUSTRIAL WHEEL TRACTORS (DOMESTIC UNITS)

	1979 RETAIL SALES	ESTIMATED MARKET SHARE
FORD	15,300	34%
J.I. CASE	13,500	30%
JOHN DEERE	8,550	19%
MASSEY-FERGUSON	4,050	9%
INT'L HARVESTER	2,700	6%
OTHERS	900	2%

Source: Truck & Off-Highway Industries Data

equipment. As a result, several construction equipment OEM insiders privately forecast sluggish annual advances of 2%-3% in shipments of heavy surface mining machinery from 1980-1985. Faster growth of 4%-5%, from 1986-1990, should follow on the heels of the federal government's new synthetic fuels program.

In the shorter term, producers of heavy construction equipment may be forced to look to international markets, although currently they are in a state of economic recession. Recovery in the arena is pegged right around the middle of 1981. Thus, Deere's Reynolds foresees energy-related equipment like large graders and excavators remaining relatively flat next year, with shipments moving ahead anywhere from 5% to 10%.

According to *TOHI* estimates, domestic deliveries of large crawler tractors in 1981 may advance by 193 units to 2175; big wheel loaders could jump by 175 units to 1975; high-capacity off-road haulers should move ahead by 50 to 230 shipments; and large scrapers could gain 17 units to end the year with 180 deliveries.

For the entire construction equipment business, stateside activity should show sluggish but steady growth during the first half of 1981, followed by a possible sharp rebound during the remainder of the year. Overall growth could approach 10%.

It may not seem like all that much to some observers. But it's a positive industry cyclical trend, considering the sharpness of a tailspin which OEMs plunged into earlier this year. As one construction equipment official assessed 1980 business, "It's been one damn thing after another." □

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LOADERS—Log & Integral Front End

MAKE AND MODEL	Type	Wheel or Track Type	Wheelbase (in.)	Track Gauge (in.)	Overall Length (in.)	Height to Top of ROPS (in.)	Digging Depth (in.) (smallest bucket)	Operating Wt. (lb.)	With Smallest GP Bucket: Static Tipping Load (lb.)	Straight (lb.)	Full 35° Turn (lb.)	Breakout Force (lb.)	Reach at Full Lift and 45° Discharge (in.)	Dump Height at Full Lift & 45° Discharge (in.)	Loader Clearance Circle (in.), Bucket in Carry Position	STANDARD SHOES: Ground Contact Area (sq. in.)	No. Track Rollers each side	Width (in.)
Trojan																		
1500C	IF-E	W	101	....	227	....	....	.....	.....	.....	.....	.....	....	.....	.....	.....	....	....
1900C	IF-E	W	106	....	257	....	....	.....	.....	.....	.....	.....	....	.....	.....	.....	....	....
2000C	IF-E	W	116	....	280	....	....	.....	.....	.....	.....	.....	....	.....	.....	.....	....	....
2500C	IF-E	W	126	....	297	....	....	.....	.....	.....	.....	.....	....	.....	.....	.....	....	....
3000C	IF-E	W	128	....	305	....	....	.....	.....	.....	.....	.....	....	.....	.....	.....	....	....
5500C	IF-E	W	148	....	345	....	....	.....	.....	.....	.....	.....	....	.....	.....	.....	....	....
7500C	IF-E	W	156	....	364	....	....	.....	.....	.....	.....	.....	....	.....	.....	.....	....	....
1500C	LL	W	101	....	256	121	....	.....	.....	.....	.....	.....	....	.....	.....	.....	....	....
1900C	LL	W	106	....	269	126	....	.....	.....	.....	.....	.....	....	.....	.....	.....	....	....
2000C	LL	W	116	....	298	133	....	.....	.....	.....	.....	.....	....	.....	.....	.....	....	....
2500C	LL	W	126	....	312	139	....	.....	.....	.....	.....	.....	....	.....	.....	.....	....	....
5500C	LL	W	148	....	380	145	....	.....	.....	.....	.....	.....	....	.....	.....	.....	....	....
7500C	LL	W	156	....	409	152	....	.....	.....	.....	.....	.....	....	.....	.....	.....	....	....

Abbreviations
AL—Allison
CAT—Caterpillar
CL—Clark
D—Diesel
DDA—Detroit Diesel Allison
E—Electric Drive
G—Gas
HP—Horsepower
HS—Hydrostatic
IF-E—Integral Front-End
JD—John Deere
LL—Log Loaders
PS—Powershift
T—Track
W—Wheel
WISC—Wisconsin

LOADERS—Backhoe

MAKE AND MODEL	Wheel Or Track Type	Operating Weight (lb)	Width (in.)	Height (in.) Transport Position	Length (in.) Transport Position	Wheelbase (in.)	Track Gauge (in.)	OPERATING RANGES: Digging Depth (in.)	Digging Radius From Swing Pivot (in.)	Loading Height (in.)	Digging Force Bucket (lb) Cylinder	Digging Force Dipper (lb) Cylinder	ENGINE: Make and Model	No. Of Cylinders	Displacement (cu in.)	Rated HP @ RPM	Gas Or Diesel	TRANSMISSION: Make and Model	No. Of Forward Speeds	No. Of Reverse Speeds	Range Of Forward Speeds	Range Of Reverse Speeds
Caterpillar																						
931B Fixed Pivot	T	18,700	74.5	132	250	71.8	....	174	205	118	9,450	6,890	Cat.....3204	....	.....	62 HP	D	.....	3	1	0-7.0	0-3.2
931B Side Shift Pivot	T	19,000	74.5	132	250	71.8	....	174	205	118	9,450	6,890	Cat.....3204	....	.....	62 HP	D	.....	3	1	0-7.0	0-3.2
D3B Fixed Pivot	T	17,800	95	132	242	72	....	174	205	118	9,450	6,890	Cat.....3204	....	.....	62 HP	D	.....	3	1	0-7.0	0-3.2
D3B Fixed Pivot	T	18,100	95	132	242	72	....	174	205	118	9,450	6,890	Cat.....3204	....	.....	62 HP	D	.....	3	1	0-7.0	0-3.2
John Deere																						
JD 302-A	W	10,110	81	131	.....	77	....	164	209	135	7,400	4,200	JD.....	3	164	50@2500	D	CM	8	8	1.3-15.7	1.6-18.3
JD 300-B	W	10,610	81	131	.....	77	....	164	209	135	7,400	4,200	JD.....	3	152	43@2500	D	CM	8	8	1.3-15.7	1.6-18.3
JD 401-C	W	11,000	81	131	294	82	....	164	209	135	7,400	4,200	JD.....	4	219	62@2500	D	CM	8	8	1.4-16.4	1.6-18.7
JD 310-A	W	13,500	82	135	283	82	....	173	208	119	9,600	6,400	JD.....	4	219	58@2500	D	CM	8	8	1.4-16.4	1.6-18.7
JD 410	W	14,200	84	138	285	82	....	182	224	141	9,700	7,200	JD.....	4	219	62@2500	D	CM	8	8	1.4-16.4	1.6-18.7
JD 500-C	W	16,000	84	140	295	82	....	180	223	140	9,700	7,200	JD.....	4	2,0	80@2500	D	PS	8	4	1.7-18.0	2.0-5.7
JD 510	..	20,500	84	140	295	82	....	206	267	142	12,600	8,900	JD.....	4	270	80@2500	D	PS	8	4	1.7-18.0	2.0-5.7
Massey-Ferguson																						
MF30B	W	11,153	77	122	256	77	62	150	180	113	8,990	6,000	Perkins.....D3-152	3	152	45@2200[1]	D	HS	4	4	1.7-20	1.5-17.3
MF40B	W	12,999	81	132	261	84	62	174	212	113	9,885	6,300	Perkins.....D4-203	4	203	54@2000[1]	D	HS	4	4	1.6-18.4	1.4-15.9
MF50C	W	12,817	81	132	273	84	62	174	212	113	9,885	6,300	Perkins.....4-236	4	236	62@2000[1]	D	HS	4	4	1.6-18.4	1.4-15.9
MF60C	W	13,800	86	150	273	82	82	184	226	141	11,000	7,412	Perkins...AD4-236	4	236	68@2200[1]	D	HS	4	4	1.7-18.9	1.7-19.0

Abbreviations
Cat—Caterpillar
D—Diesel
G—Gas
JD—John Deere
HP—Horsepower
HS—Hydraulic Shuttle
PS—Power Shift
T—Track Type
W—Wheel Type

Footnotes
[1]—Net Flywheel Horsepower

NORTH AMERICAN SELF-PROPELLED COMBINE OUTPUT

Company	1979 Retail Sales	Market Share Estimates
John Deere	12,210	33%
Massey-Ferguson	7,400	20%
International Harvester	7,400	20%
Allis-Chalmers	5,180	14%
White	2,220	6%
Sperry-New Holland	1,480	4%
Ford	370	1%
Canadian Cooperative	370	1%
Avco-New Idea	370	1%

Source: Truck & Off-Highway Industries Data

BUCKET							ENGINE					TRANSMISSION				
Loaders, Heaped (cu. yd.)	Loaders, Struck (cu. yd.)	Rated Load (lb.)	Width (in.) Over Bucket	Max. Dumping Clearance (in.)	Max. Clearance Under Hingepin (in.)	Raising Time, Loaded (sec.)	Make and Model	No. of Cylinders	Displacement (cu. in.)	Rated HP @ RPM	Gas or Diesel	Type	No. Forward Speeds	No. of Reverse Speeds	Range of Forward Speeds	Range of Reverse Speeds
1.75	1.52	.....	96	108	136.5	6.2	DDA.....3-53	3	159	.....	D	AL.....PS	4	2	.....	.....
2.29	1.99	.....	96	109	140	6.6	DDA.....4-53	4	212	.....	D	AL.....PS	4	2	.....	.....
3	2.5	.....	100	111	152	6.6	DDA.....4-71N	4	284	.....	D	AL.....PS	4	2	.....	.....
3.93	3.28	.....	118	122	161	6.3	DDA.....6V-71N	6	426	.....	D	CL.....PS	4	4	.....	.....
4.25	3.65	.....	118	121	164	6.8	DDA.....6V-71N	6	426	.....	D	CL.....PS	4	4	.....	.....
6	5	.....	139	129	174	8.2	Cummins.....NT855-C310	....	855	310 HP	D	AL.....PS	4	2	.....	.....
7.6	6.5	.....	143.5	139	189.5	8.8	Cummins.....KT1150-C450	....	1150	450 HP	D	CL.....PS	4	4	.....	.....
....	....	.....	....	....	....	....	DDA.....3-53N	3	159	450 HP	D	.....	4	2	2.8-25	0-9.5
....	....	.....	....	....	....	....	DDA.....4-53N	4	212	.....	D	.....	4	2	2.1-21.8	0-8
....	....	.....	....	....	....	....	DDA.....4-71N	4	284	.....	D	.....	4	2	2.4-20.8	0-7.7
....	....	.....	....	....	....	....	DDA.....6V-71N	6	426	.....	D	.....	4	4	3.7-21	.....
....	....	.....	....	....	....	....	Cummins.....NT855-310	....	855	310 HP	D	.....	4	4	2.8-20.1	2.8-20.2
....	....	.....	....	....	....	....	Cummins.....KT1150-C450	....	1150	450 HP	D	.....	4	4	3.7-19.5	3.7-19.5

Footnotes
[1]—931B also available in a low ground pressure model
[3]—At 40° turn
[4]—At 37° discharge
[5]—Also Perkins, 4-cylinder, 236 cu. in., 81 HP @ 2600 RPM, diesel engine
[6]—At 45° turn

U.S. FACTORY SALES—HEAVY DUTY TRUCKS BY MAKE AND GVW—8 MOS. 1980

MAKE	19,501-26,000	26,001-33,000	33,001 & Over	Total
Chevrolet	12,699	476	1,659	315,516
GMC	16,670	1,591	12,345	104,971
Chrysler	2,024	392	168	101,466
Ford	9,189	27,048	12,337	352,634
Freightliner	-	-	6,970	6,970
International	4,143	8,449	12,546	31,147
Jeep Corp.	-	-	-	45,639
AM General	-	-		716
Kenworth	-	-	7,867	7,867
Mack	-	-	16,393	16,393
Peterbilt	-	-	4,906	4,906
Volkswagen of America	-	-	-	20,428
White	-	-	5,119	5,119
Others	20	5	1,491	1,555
TOTAL TRUCKS	44,745	37,961	81,801	1,015,327

Source: MVMA

SKIDDERS/GRAPPLE SKIDDERS

MAKE AND MODEL	Operating Weight (lb.)	Length With Dozer (in.)	Wheelbase (in.)	Width Over Tires (in.)	Height To Top Of ROPS (in.)	Height To Exhaust (in.)	Ground Clearance To Axle (in.)	Tread Width With Smallest Tires (in.)	Max. Unloaded Operating Weight (lb.)	Turning Diameter (in.), Outside Rear Wheel	Outside Turning Radius (in.)	TIRES		BLADE			
												Size, Front	Size, Rear	Width (in.)	Height (in.)	Max Drop Below Ground Level (in.)	Max. Lift Above Ground Level (in.)
CATERPILLAR																	
518	20,500	226	114	99	110	111	22[1]	81.5	24,500	204[2]	.....	18.4x34	18.4x34	.....	.....	.....	.....
528	30,690	265	128	116	116	117	.....	91	34,000	450	.....	24.5x32	24.5x32	.....	.....	.....	.....
DEERE																	
JD440-C Skidder	14,175	205	94	92.4	.....	112	18	74	.....	.....	196	18.4x26	18.4x26	72	20[4]	9.5	48
JD440-C Grapple Skidder	16,525	239[5]	106	92.4	.....	112	18	74	.....	.....	212	18.4x26	18.4x26	72	20[4]	9.5	48
JD540B Skidder	16,675	224	106	111.9	.....	115	21	76	.....	.....	196	23.1x26	23.1x26	83	20[4]	9	52
JD540B Grapple Skidder	18,675	242[5]	106	103.4	.....	115	21	76.5	.....	.....	196	23.1x26	23.1x26	83	20[4]	9	52
JD640 Skidder	19,900	248.5	113	107.5	.....	119.5	23.7	86.4	.....	.....	214	24.5x32	24.5x32	.....	.....	.....	.....
JD640 Grapple Skidder	26,250	266.4[5]	120	111.5	.....	.....	23.7	86.7	.....	.....	222	34.5x32	24.5x32	.....	.....	.....	.....
JD740-A Skidder	30,280	259	120	127.5	.....	125.5	20	93	.....	.....	209	30.5x32	30.5x32	.....	.....	.....	.....
JD740-A Grapple Skidder	36,320	.....	130	127.5	.....	.....	.....	.....	.....	.....	226.7	30.5x32	30.5x32	.....	.....	.....	.....
EATON																	
208E	12,500[6]	215	112	94	.....	101	18	77	.....	.....	.....	16.9x30	16.9x30	82	22	14	49
225E	13,240[6]	220	117	89	.....	101	18	72	.....	.....	.....	16.9x30	16.9x30	82	22	15	48
230E	15,060[6]	224	117	98	.....	104	21	79	.....	.....	.....	18.4x34	18.4x34	82	22	12	51
230E	13,780[6]	224	117	98	.....	104	22	79	.....	.....	.....	18.4x34	18.4x34	82	22	12	51
240E	15,600[6]	224	117	98	.....	104	21	79	.....	.....	.....	18.4x34	18.4x34	82	22	12	51
240E	15,600[6]	224	117	98	.....	104	21	79	.....	.....	.....	18.4x34	18.4x34	82	22	12	51
350	16,700[6]	227	116	98	.....	115.5	22	79	.....	.....	.....	18.4x34	18.4x34	84	25	9.25	54.4
380	18,000[6]	227	116	98	.....	115.5	22	79	.....	.....	.....	18.4x34	18.4x34	84	25	9.25	54.4
450	19,000	227	116	98	.....	116	22	79	.....	.....	.....	18.4x34	18.4x34	84	25	9.25	54.4
450	19,000[6]	227	116	98	.....	116	22	79	.....	.....	.....	18.4x34	18.4x34	84	25	9	54
520	24,600[6]	244	130	117	.....	123.8	23	92.4	.....	.....	.....	24.5x32	24.5x32	84.5	25	6	56
520 Clam Bunk Skidder	40,157[6]	376	240	115	141	.....	27	95	.....	.....	.....	24.5x32	20.5x25	.....	.....	.....	.....
550	26,523[6]	259	140	117	.....	123	22	93	.....	.....	.....	24.5x32	24.5x32	93	30	8	50
380 Grapple Skidder	22,800[6]	227	131	98	.....	116	22	79	.....	.....	.....	23.1x26	23.1x26	84	25	9.3	54.4
520 Grapple Skidder	30,200[6]	258	147	113.5	.....	125.3	27	89	.....	.....	.....	24.5x32	24.5x32	92.5	31.5	7.2	58

Abbreviations:
Auto—Automatic
Cat—Caterpillar
CM—Constant Mesh
D—Diesel
G—Gas

GR—Gearmatic
JD—John Deere
LMD—Live Mechanical Drive
PS—Power
SR—Syncromesh
TC—Torque Converter

Footnotes:
[1]—With 23.1 x 26 tires
[2]—With narrow tread
[3]—Without grapple
[4]—Height at ends
[5]—Length with grapple
[6]—Shipping weight
[7]—Also available with Perkins 4.236E, 4-cylinder, 236 cu. in., 67 HP @ 2,600 RPM engine
[8]—Also available with Perkins 4.236-E, 4-cylinder, 236 cu. in., 78 HP @ 2600 RPM engine

NORTH AMERICAN 2WD FARM TRACTOR OUTPUT
(100 hp or more)

Company	1979 Retail Sales	Market Share Estimates
John Deere	27,419	37%
International Harvester	18,526	25%
J. I. Case	9,634	13%
Allis-Chalmers	5,928	8%
White	4,446	6%
Massey-Ferguson	3,705	5%
Ford	3,705	5%
Others	742	1%

Source: Truck & Off-Highway Industries Data

WINCH			GRAPPLE			ENGINE					TRANSMISSION				
MAKE AND MODEL	Max. Line Pull At Stall (lb.)	Max. Line Speed With Bare Drum (FPM)	Operating Weight (lb.)	Max. Opening (in.)	Max. Lifting Capacity (lb.)	MAKE AND MODEL	No. of Cylinders	Displacement (cu. in.)	Rated HP @ RPM	Gas or Diesel	MAKE AND MODEL	No. of Forward Speeds	No. of Reverse Speeds	Range of Forward Speeds	Range of Reverse Speeds
GR.....119	32,000	435	.....	.....	.....	Cat.....3304	4	425	120@2200	D	Cat PS/TC	3	3	4.6-16.5	5.5-19.8
Cat.....528	40,000	229	27,500[3]	.....	.....	Cat.....3306	6	638	130@2200	D	Cat PS/TC	3	3	5.2-18.7	6.3-22.8
LMD.....	23,906	120	.....	.....	.....	JD.....	4	276	70@2200	D	SR/CM	6	3	2-15	2-10
LMD.....	23,906	120	16,525	75	17,600	JD.....	4	276	70@2200	D	SR/CM	6	3	2-15	2-10
.....	30,541	115	.....	.....	.....	JD.....	4	276	90@2200	D	PS	8	4	1.7-17.9	2-5.8
.....	30,541	115	18,675	75	20,700	JD.....	4	276	90@2200	D	PS	8	4	1.7-17.9	2-5.8
.....	33,204	136	.....	.....	.....	JD.....	6	414	110@2200	D	PS	8	4	1.76-17.94	2.34-6.22
.....	39,251	115	26,250	120	25,000	JD.....	6	414	110@2200	D	PS	8	4	1.76-17.94	2.34-6.22
LMD.....	51,880	116	.....	.....	.....	JD.....	6	466	152@2200	D	PS	8	4	1.63-18.4	2-5.79
LMD.....	51,880	116	36,320	120	30,750	JD.....	6	466	152@2200	D	PS	8	4	1.63-18.4	2-5.79
Eaton.....20	20,000	260	.....	.....	.....	GM.....3-53N[7]	3	159	74@2600	D	SM	8	8	1.9-16.2	1.9-16.2
Eaton.....20	20,000	260	.....	.....	.....	GM.....3-53N[7]	3	159	74@2600	D	SM	8	8	1.7-14.9	1.7-14.9
Eaton.....20	20,000	350	.....	.....	.....	GM.....3-53N	3	159	98@2800	D	Auto	6	2	3.7-17.9	2-5
Eaton.....20	20,000	376	.....	.....	.....	GM.....3-53N[8]	3	159	94@2600	D	SM	8	8	1.9-16.3	1.9-16.3
Eaton.....20	20,000	240	.....	.....	.....	GM.....4-53N[9]	4	212.4	130@2600	D	SM	8	8	1.9-16.3	1.9-16.2
GR.....119	30,000	330	.....	.....	.....	GM.....4-53N[9]	4	212.4	130@3600	D	Auto	6	2	3.5-16.9	2.4-4.7
Eaton.....20	20,000	376	.....	.....	.....	GM.....3-53N	3	159	98@2800	D	PS	3	3	3.8-21.6	3.8-21.6
Eaton.....20[10]	20,000	376	.....	.....	.....	GM.....4-53N[11]	4	212	136@2800	D	PS	3	3	3.7-19.3	3.7-19.3
GR.....119	30,000	461	.....	.....	.....	GM.....4-53N[12]	4	212	136@2800	D	PS	3	3	3.7-19.3	3.7-19.3
GR.....119	30,000	441	.....	.....	.....	GM.....4L-53T	4	212	155@2500	D	PS	3	3	3.2-18.5	3.2-18.5
Eaton.....T-50	45,000	300	.....	.....	.....	GM.....6V-53N	6	318	185@2500	D	PS	3	3	4.8-18.4	4.8-18.4
.....	.....	.....	40,157[4]	.....	.....	GM.....6V-53	6	318	185@2500	D	PS	4	4	3.4-18	3.4-18
Eaton.....T-50[13]	45,000	530	.....	.....	.....	GM.....6V-53N[14]	6	318	201@2600	D	PS	4	4	0-18.8	0-18.8
Eaton.....20	20,000	276	27,800[5]	105	.....	GM.....4-53N	4	212	136@2800	D	PS	3	3	3.7-19.4	3.7-19.4
GR.....119	30,000	450	30,200[6]	120	.....	GM.....6V-53N	6	318	185@2500	D	PS	3	3	4.6-17.8	4.6-17.8

[9]—Also available with a Perkins 6.354, 6-cylinder, 354 cu. in., 111 HP @ 2600 RPM engine

[10]—Also available with Gearmatic 119, 30,000 lb. max. line pull and 461 FPM line speed

[11]—Also available with a Perkins 6.354, 4-cylinder, 354 cu. in., 112 HP @ 2,600 RPM engine

[12]—Also available with Cummins V378, 6-cylinder, 378 cu. in., 136 HP @ 2,600 engine

[13]—Also available with Gearmatic 190, 40,000 lb. max. line pull and 276 FPM line speed

[14]—Also available with a Cummins V-555-C-200, 6-cylinder, 555 cu. in., 192 HP @ 2,600 RPM engine

NORTH AMERICAN 4WD FARM TRACTOR OUTPUT

Company	1979 Retail Sales	Market Share Estimates
Versatile	3,008	21%
International Harvester	2,722	19%
John Deere	2,436	17%
J.I. Case	2,292	16%
Steiger	1,719	12%
White	716	5%
Allis-Chalmers	573	4%
Massey-Ferguson	430	3%
Ford	287	2%
Others	143	1%

Source: Truck & Off-Highway Industries Data

TRACTORS—Crawler

MAKE AND MODEL	Length (in.)	Width (in.)	Height (in.)	Operating Weight (lb.)	Ground Clearance (in.)	CRAWLER: Pad Width (in.)	CRAWLER: Length (in.)	CRAWLER: Tread (in.)	ENGINE: Make And Model	ENGINE: No. of Cylinders	ENGINE: Displacement (cu. in.)	ENGINE: Rated HP @ RPM	ENGINE: Gas or Diesel	TRANSMISSION: Make And Model	TRANSMISSION: No. of Forward Speeds	TRANSMISSION: No. of Reverse Speeds	TRANSMISSION: Range of Forward Speeds	TRANSMISSION: Range of Reverse Speeds
Caterpillar																		
D3B	145	95	105	14,054	12	12	.....	56	Cat. 3204	4	318	65@2400	D	Cat. PPS[1]	3	1	1.9-7.1	3.2
D3BLGP	118	90	105	15,880	12	25	.....	65	Cat. 3204	4	318	65@2400	D	Cat. PPS[1]	3	1	1.9-7.1	3.2
D4E	126	78	115	19,450[2]	14	13	.....	60	Cat. 3304	4	425	75@2000[3]	D	Cat. PPS	3[4]	3[4]	2.1-5.9[5]	2.5-7.1[6]
D4ELGP	166	120	115	22,110[7]	14	30	.....	70	Cat. 3304	4	425	75@2000	D	Cat. PPS	3[4]	3[4]	2.1-5.9[8]	2.5-7.1[6]
D4ESA	132	78	113	18,260	14	16	.....	60	Cat. 3304	4	425	68@2000	D	SSG	5	5	2.6-4.7	3.0-5.5
D5B	143	93	116	24,800	10.9	16	.....	74	Cat. 3306	6	638	105@1750	D	Cat. PPS	3[4]	3[10]	2.2-6.3[11]	2.6-7.6[12]
D5BLGP	196	115	116	32,400	10.9	34	.....	81	Cat. 3306	6	638	105@1750	D	Cat. PPS	3[4]	3[10]	2.2-6.3[11]	2.6-7.6[12]
D5BSA	153	93.25	118	23,320	10.9	18	.....	74	Cat. 3306	6	638	90@1900	D	SSG	6	4	2.5-5.6	3.2-5.3
D6D	147	93	120	31,500	12.2	18	.....	74	Cat. 3306	6	638	140@1900	D	Cat. PPS	3[4]	3[10]	2.5-6.7[11]	3.0-8.0[13]
D6DLGP	203	119	120	38,300	12.2	36	.....	83	Cat. 3306	6	638	140@1900	D	Cat. PPS	3	3	0-2.5-0-6.7	0-3-0-8.0
D6DSA	156	94	124	29,500	12.2	20	.....	74	Cat. 3306	6	638	125@2000	D	SSG	6	4	42.5-5.5	4.1-6.3
D7G	165	103	132	44,300[14]	13.7	20	.....	78	Cat. 3306	6	638	200@2000	D	Cat. PPS	3[10]	3[10]	0-2.3-0-6.2[11]	0-2.8-0-7.4[15]
D7GLGP	224	131	129	52,100	13.7	34	.....	86	Cat. 3306	6	638	200@2000	D	Cat. PPS	3[4]	3[10]	0-2.3-0-6.2[16]	0-2.8-0-7.4[15]
D8K	207	120	134	70,500[17]	17.1	22	.....	84	Cat. D342	6	1246	300@1330	D	Cat. PPS	3[18]	3[18]	0-2.5-0-6.8[19]	0-3.1-0-8.4[19]
D9H	221	131	148	93,600	18.1	24	.....	90	Cat. D353	6	1473	410@1375	D	Cat. PPS	3	3	0-2.5-0-6.7	0-3.1-0-8.2
D10	298	216	178	190,300	27.6	28	.....	114	Cat. D348	12	1786	700@1800	D	Cat. PPS	3	3	2.4-7.2	2.9-8.6
Deere																		
JD350C	135	.....	91	12,050	13.25	33	69.3	68	JD	3	152	42@2500	D	SSG	4	4	1.4-6.5	1.4-6.5
JD350-C/6300	132	.....	91	10,150	13.25	14	69.3	48	JD	3	152	42@2500	D	SSG	4	4	1.4-6.5	1.4-6.5
JD350-C/6305	135	.....	91	10,600	13.25	14	69.3	48	JD	3	152	42@2500	D	SSG	4	4	1.4-6.5	1.4-6.5
JD350-C/6310	133.5	.....	91	10,400	13.25	14	69.3	48	JD	3	152	42@2500	D	SSG	4	4	1.4-6.5	1.4-6.5
JD450-C/6405	142	.....	95.8	14,230	14.25	16	72.75	52	JD	4	219	65@2500	D	PS	4	4	1.3-6.7	1.7-6.4
JD450-C/6410	148.5	.....	95.8	14,170	14.25	16	72.75	52	JD	4	219	65@2500	D	PS	4	4	1.3-6.7	1.7-6.4
JD450-C/6415	137	.....	95.8	14,650	14.25	16	72.75	52	JD	4	219	65@2500	D	PS	4	4	1.3-6.7	1.7-6.4
JD550/6405	142	.....	100.9	15,480	14.25	16	72.75	52	JD	4	276	72@2200	D	PS	3	3	2.05-5.73	2.44-6.80
JD550/6410	148.5	.....	100.9	15,340	14.25	16	72.75	52	JD	4	276	72@2200	D	PS	3	3	2.05-5.73	2.44-6.80
JD550/6415	137	.....	100.9	15,750	14.25	16	72.75	52	JD	4	276	72@2200	D	PS	3	3	2.05-5.73	2.44-6.80
JD750/6520	189.6	.....	122.6	29,390	14	18	90	74	JD	6	414	110@2100	D	HS	....	....	0-6.5	0-6.5
JD750/6525	185.6	.....	122.6	29,055	14	18	90	74	JD	6	414	110@2100	D	HS	....	....	0-6.5	0-6.5
JD750	185.6	.....	122.6	31,375	14	34	90	74	JD	6	414	110@2100	D	HS	....	....	0-6.5	0-6.5
JD850/6540	193.5	.....	126	37,120	16.4	20	95	74	JD	6	619	145@1800	D	HS	....	....	0-6.5	0-6.5
JD850/6545	192	.....	126	36,785	16.4	20	95	74	JD	6	619	145@1800	D	HS	....	....	0-6.5	0-6.5
Terex																		
82-20B	157	98	92	47,027	17	20	107	78	DDA 6V-71T	6	426	205 HP	D	DDA CRT5434	3	3	0-7.0	0-7.9
82-30B	184	102	103	64,637	18.25	22	124	78	DDA 8V-71T	8	568	260 HP	D	DDA CRT6031	3	3	0-7.0	0-8.4
82-50	194	113	110	89,556	21.3	24	131.44	84	DDA 12V-71T	12	852	370 HP	D	DDA CRT7031	3	3	0-7.0	0-8.4

Abbreviations
Cat—Caterpillar
D—Diesel
DDA—Detroit Diesel Allison
HP—Horsepower
HS—Hydrostatic
JD—John Deere
P—Planetary
PS—Powershift
SSG—Selective sliding gear

Footnotes
[1]—Also available with three forward and three reverse speeds
[2]—Direct drive—19,330 lb.
[3]—Direct drive—75 @ 1,900
[4]—Direct drive—5
[5]—Direct drive—1.7-5.9
[6]—Direct drive—2.1-6.9
[7]—Direct drive—22,240 lb.
[8]—Direct drive—1.5-5.1
[9]—Direct drive—1.8-6.1
[10]—Direct drive—4
[11]—Direct drive—1.7-6.9
[12]—Direct drive—2.1-6.3
[13]—Direct drive—2.1-6.0
[14]—Direct drive—44,000 lb.
[15]—Direct drive—1.6-6.3
[16]—Direct drive—1.9-5.8
[17]—Direct drive—69,300 lb.
[18]—Direct drive—6
[19]—Direct drive—1.7-7.1

Diesel Engines Used in Trucks From U.S. Plants—8 Mos. 1980

Make	Cat.	Cummins	DDA	IH	Isuzu	Mack	Nis.	Olds.	Perkins	Scania Vabis	Volkswagen	Total
Chevrolet	727	162	2,483	—	—	—	—	25,182	—	—	—	28,554
Chrysler	—	168	—	—	—	—	—	—	1,056	—	—	1,224
Ford	13,759	6,035	7,190	—	—	—	—	—	—	—	—	26,984
Freightliner	891	4,409	1,670	—	—	—	—	—	—	—	—	6,970
GMC	2,389	4,390	9,811	—	—	—	—	10,353	—	—	—	26,943
International	1,071	9,383	2,379	7,484	—	—	2,887	—	—	—	—	23,204
Jeep Corp.	—	—	—	—	1,579	—	—	—	—	—	—	1,579
Kenworth	1,349	4,675	1,843	—	—	—	—	—	—	—	—	7,867
Mack	169	1,128	233	—	—	14,645	—	—	—	218	—	16,393
Peterbilt	921	2,984	1,001	—	—	—	—	—	—	—	—	4,906
Volkswagen	—	—	—	—	—	—	—	—	—	—	11,618	11,618
White	403	3,537	1,179	—	—	—	—	—	—	—	—	5,119
Others	359	555	602	—	—	—	—	—	—	—	—	1,516
TOTAL	22,038	37,426	28,391	7,484	1,579	14,645	2,887	35,535	1,056	218	11,618	162,877

Source: MVMA

Chilton's

TRUCK & OFF-HIGHWAY INDUSTRY

May/June 1981

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THE HEAVY DUTY INTERNATIONAL MARKET

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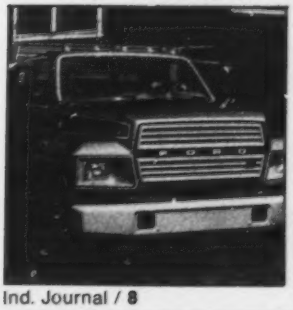

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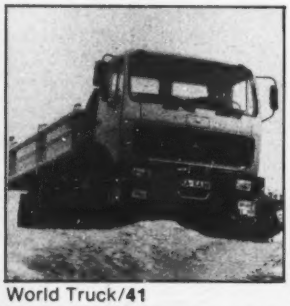

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COVER

Heavy-duty exports are hopping. (Photo courtesy Atlantic Container Line, NY.)

NEXT ISSUE

With our July issue, *TOHI* goes monthly! Our first monthly issue looks into the construction equipment industry with a mid-year business review.

TRUCK & OFF-HIGHWAY INDUSTRIES (USPS 461-290) magazine is published bimonthly (Jan/Feb, Mar/Apr, May/June, July, Aug, Sept, Oct, Nov, Dec) by Chilton Co., Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies Inc., New York, NY. Subscription prices: United States—$20.00 per year, $38.00 for 2 years; Canada and Foreign—$50.00 per year. Air rates on request. Single copies and back issues on request. All subscription orders must be accompanied by cash or check along with complete information for classification, including title of the individual and the product the company manufactures. 2nd class postage paid at Philadelphia, PA 19104 and additional mailing offices. POSTMASTER: Send address changes to TRUCK & OFF-HIGHWAY INDUSTRIES, P.O. BOX 2055, Radnor, PA 19089. ©Chilton Company, 1981.

More and more construction OEMs like Euclid are taking export business seriously, partially offsetting losses of volume in the States with higher volume overseas.

As American producers of heavy equipment head offshore in quest for market equilibrium, Japanese and European OEMs are entering the U.S.

by John A. Stark

International business, once relegated to lowly export status by major manufacturers of heavy capital equipment, may become a scene of hot contention in the near future.

High volume producers in slow-growth domestic markets are moving into offshore markets for higher growth. This leads to improved margins of profit in the manufacturing process.

Low-volume OEMs are most seriously affected by sharp cyclical downturns in the domestic marketplace. They are swinging towards greater international business to help offset domestic losses in unit volume.

Last year, for example, domestic sales of construction machinery nosedived 40% while exports of this equipment edged up 3%, helping to ease the business cycle pain for OEMs engaged in active export markets.

One notable exception was rear dump trucks. Domestic sales dropped 30% during the year, to 1200 units, while export markets collapsed. Shipments to overseas destinations plunged 72% to 1172 units.

Euclid president P. E. Rupp told *Truck & Off-Highway Industries*, "The drive toward export markets in our [low-volume, construction equipment] industry is a battle for survival. Each manufacturer must look for international markets to compensate for and offset downturns in local markets.

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EXPORTS

"The battle for survival will be fierce and there will be many casualties. I think we will see further mergers and several acquisitions."

Rupp pointed out, however, that Euclid, a Daimler-Benz AG subsidiary, doesn't plan to be among the casualties.

To avoid this mishap, Rupp said Euclid is actively investigating six to seven projects in Central and South America and elsewhere, where joint ventures in the assembly of off-highway trucks may be in the offing.

A drive towards greater international markets is nothing new for producers like Caterpillar, Komatsu and Euclid. Cat reportedly conducts 57% of its business overseas. Komatsu's offshore penetration shadows that mark. And Euclid hit a 50% target last year.

This is in stark contrast to the typical 70% domestic/30% international business for most construction equipment OEMs, according to Deere's C. B. Reynolds, vice president-marketing, Industrial Equipment Div.

Reynolds pointed out that several areas of the globe—most notably the Middle East, Far East, Central and South America—are drawing lots of construction machinery inquiries.

In the Far East, for instance, more and more log skidders are being used to supply wood products to Japanese markets. In Central America (principally Mexico), crawlers continue to clear land for agricultural and highway purposes.

International Harvester's Construction Equipment Group recently announced its intent to enter a joint venture in Mexico. This will be for production of mid-size crawler tractors (TD-15, TD-20 and TD-25 models). A manufacturing site has yet to be selected.

Harvester also reached an accord with Bumar, the Polish Foreign Trade Enterprise. A joint marketing venture named Cetco Ltd. was set up in London to sell construction machinery in select parts of the world.

Exports are a key segment of business for global manufacturers of heavy equipment like France's Poclain.

As more U.S. manufacturers seek market equilibrium via the overseas route, foreign-based counterparts are rushing to North America for similar strategic purposes.

One of the newest entrants is the French-based Poclain—a J.I.Case subsidiary and highly respected producer of hydraulic excavators in Europe, South America and elsewhere. Last year, Poclain started manufacture of large, surface mining excavators at Wausau, WI.

Poclain eventually expects to assemble its five largest excavators at the Wisconsin site, with a supposed business strategy of improving its North American sales.

As Poclain focuses its sights on greater North American business, Komatsu reportedly plans to build construction equipment—presumably crawler tractors and loaders—at a new location in Europe, for access to Middle East and African markets. It represents a formidable challenge to West German-based IBH Holding AG, Europe's leading producer of construction machinery.

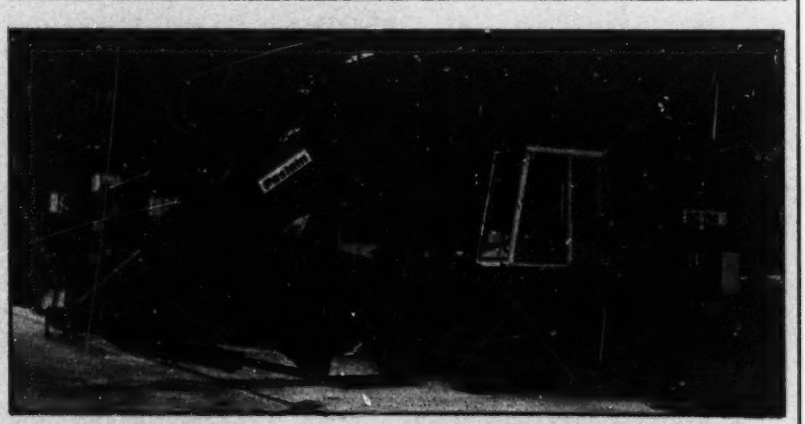
What's unclear about this newest Komatsu development is whether the European facility will consist of assembly or manufacturing operations.

"There's a big difference in establishing an assembly plant vs. a manufacturing complex in a foreign country," Euclid's Rupp pointed out. "Assembly plants are generally justified on the benefits of over-and-above shipments of complete units. Market potential and antici-

U.S. Construction Machinery Exports Buoy Domestic Losses In '80

Type of Equipment	1979	1980	1981
Crawler Tractors	6902	7061	6360
Crawler Loaders	1117	1211	1100
Wheel Loaders	3908	5576	5018
Scrapers	2002	1799	1620
Motor Graders	3550	4581	4000
Rear Dump Trucks	4178	1172	1560
Skidders	803	999	1200
Trenchers/Ditchers	3000	2536	2300
Ind. Wheel Tractors	2530	3200	3600
Hydraulic Excavators	1185	1995	2300
Cranes	2500	2400	2200

Source: Truck & Off-Highway Industries Data



Many construction machinery OEMs label Brazil indispensable to South America's third world markets. Hence, producers like Poclain build heavy equipment there.

pated volume are crucial factors. To justify a manufacturing operation, a corresponding level of technical know-how must be present as well."

Like its chief competitors, Euclid is eyeballing Mexico with keen interest. "It's one of the funny things in our industry that everybody seems to be racing to the same place at the same time," Rupp said.

"Euclid, like others, is conducting a feasibility study there [Mexico]. We're also looking at other areas of the globe where it's possible to set up assembly operations in order to maintain a permanent foothold in the market, over and above the once-only large order."

One of these markets is Brazil—a nation where local production of components and machinery is a must for conducting local business. However, the Brazilian government recently ended monetary incentives to vehicle OEMs which build locally and export. It reportedly is a setback to construction machinery assemblers in the country.

"To enter a nation only because of favorable currency exchange ratios and export incentives is a shortsighted business policy," the Euclid chief emphasized. "Policies can change."

As high volume producers like Komatsu, International Harvester, Case/Poclain and Deere follow Caterpillar's lead by shifting assembly and manufacture of strategic vehicles closer to key global markets, increased local content follows suit. But this can lead to lower level of quality standards for locally-sourced components.

Many manufacturers, especially the Japanese, are overcoming this possible deficiency with the export of successful manufacturing methods. These include:

- Quality circles (increased worker role in quality control policies).
- Overlapped production (a reliance on timely delivery to reduce raw material and parts inventories).
- Minimum assembly lots and uniform plant load scheduling.
- Reduced set-up times for shorter production runs.
- Total preventive maintenance (any worker can stop the production line when his machine malfunctions).
- Plus, minus, zero production scheduling (worker does a day's work whether it takes 4, 8 or 12 hours).
- Use of dependent (captive) subcontractor network.

Poclain's managing director, D. S. Bigelow, told *TOHI*, "Part of our [international] business strategy is a manufacturing-designing strategy. Even though each market has a number of special characteristics, we have to be very careful that our base machines are designed with a number of common characteristics. [This] helps us amplify economies of scale in the production process."

Some of these common design characteristics include standardized cabs, undercarriages and hydraulic hardware. Greater vertical integration extends margins of profit for volume builders of construction equipment. And international markets "will help us achieve greater vertical integration due to higher volume of unit output," Euclid's Rupp added.

Yet one crucial question remains. Will higher export volume be forthcoming in the near term as the U.S. dollar gains strength and the Japanese yen loses ground? ■

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Chilton's

TRUCK & OFF-HIGHWAY INDUSTRY

July 1981

EXCLUSIVE REPORT

FORD R... COMPAC...

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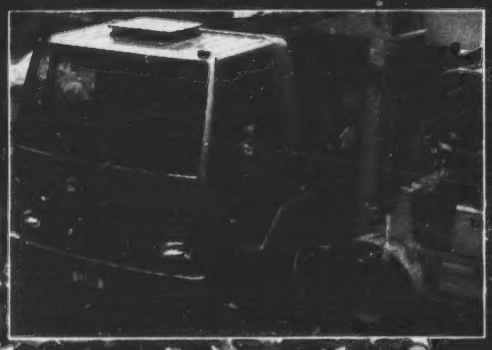
CONSTRUCTION FLOUNDERS IN '81



NEW EUROPEAN OTR TRUCKS

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Chilton's

July, 1981

TRUCK & OFF-HIGHWAY INDUSTRIES

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COVER

An International Harvester Hauler and Ford Of Europe's new Cargo grace this month's cover.

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Our August issue looks at construction equipment design, heavy-duty plastic applications and Cummins' operations in Europe.

TRUCK & OFF-HIGHWAY INDUSTRIES (USPS 461-280) magazine is published bimonthly (Jan/Feb, Mar/Apr, May/June, July, Aug, Sept, Oct, Nov, Dec) by Chilton Co., Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies Inc., New York, NY. Subscription prices: United States—$20.00 per year, $38.00 for 2 years; Canada and Foreign—$50.00 per year. Air rates on request. Single copies and back issues on request. All subscription orders must be accompanied by cash or check along with complete information for classification, including title of the individual and the product the company manufactures. 2nd class postage paid at Philadelphia, PA 19104 and additional mailing offices. POSTMASTER: Send address changes to TRUCK & OFF-HIGHWAY INDUSTRIES, P.O. BOX 2056, Radnor, PA 19089. ©Chilton Company, 1981.

Ford Readies Major US Truck Launch

by John A. Stark

A shift in business strategy is underway at Ford Motor Co., Dearborn, MI as it prepares to launch stateside production of a new, compact Ranger pickup truck on January 16 at Louisville, KY.

It trails by nearly six months a similar move at General Motors. GMC and Chevrolet will launch a new compact S-series pickup truck later this summer at three domestic assembly sites in Pontiac, MI; Morraine, OH; and Shreveport, LA.

Ford vice president and division general manager J. A. Capolongo told *TOHI*, "Some very volatile moves in assembly plant capacity planning are occurring throughout the entire domestic light truck business for two reasons—slow truck sales and a trend toward compact pickup trucks."

Domestic retail sales of pickup trucks, for example, slid 14.5% to 1.9 million units in 1979, dropped 29% to 1.34 million in 1980, and are at a yearly rate of 1.06 million trucks in 1981—a 21% downturn.

Meanwhile, a noticeable shift from conventional to compact light trucks is picking up steam. The compact pickup truck share of market jumped to 14.4% last year at GM, to 14% at Ford and to 44.5% at Chrysler.

Ford Truck general manager J. A. Capolongo disclosed plans to turn the Louisville, KY car-truck plant over to compact, Ranger truck output soon. The plan mothballs conventional pickup truck capacity.

A trend toward smaller pickup trucks, for the most part, is being fired by high fuel prices, vehicle downsizing to accommodate federal fuel economy standards and relatively lower vehicle price tags.

Domestic light truckmakers like GM, Ford and Chrysler plan to cash in on the switch to compact pickup trucks by vertically integrating the vehicle manufacturing process via stateside assembly.

Ford's Capolongo explained that his division plans to end full size production along one final assembly line at Louisville by October, transfer the existing work to the other assembly line for a second shift in F-series conventional pickup truck production at the site, and then retool the vacant line for Ranger truck assembly. The F-series line will be overhauled for Ranger output at the end of the year.

"We're about to go to two shifts with our F-series conventional truck buildup at Louisville during October to prepare the labor force for a changeover to small compact Ranger truck output on January 16," Capolongo said.

"Ford plans to build approximately 300,000 Ranger trucks during the first year of production," he added, "with output reaching 400,000 annual units in 1983 or 1984. If demand for the Ranger exceeds our expectations, we may add a second assembly facility. Ford already has identified 2-3 existing sites as possible candidates."

What Ford essentially plans to accomplish at Louisville is to yank conventional pickup truck capacity of about 200,000 units from the complex and replace it with domestic compact pickup truck capacity of 400,000 vehicles.

GM plans similar changes in production capacity for pickup trucks, too. GM has confirmed that it plans to mothball conventional pickup truck capacity at its Baltimore, MD complex later this year, turning the truck assembly line over to output of an as-yet-unnamed front-wheel-drive automobile.

GMC's van assembly facility in Pontiac will be converted to S-series compact pickup truck output later this month, at a production rate of 27 units hourly.

Another existing plant in Morraine will also be converted to compact truck assembly next month at six trucks per hour.

Finally, a new complex in Shreveport will also enter the compact pickup production network at 40 units hourly. All GM plants will operate

(Continued)

DOMESTIC RETAIL SALES OF PICKUP TRUCKS BY CALENDAR YEAR

MANUFACTURER	TYPE	1978 VOLUME	%	1979 VOLUME	%	1980 VOLUME	%	4 MOS. 1981 VOLUME	%
General Motors	Compact	67,035	6.2	100,192	11.3	88,447	14.4	29,191	14.5
	Conventional	1,010,688	93.8	789,233	88.7	527,631	85.6	172,404	85.5
	Total	1,077,723		889,425		616,078		201,595	
Ford	Compact	70,557	7.5	78,088	9.8	77,375	14.0	24,174	14.1
	Conventional	863,425	92.5	717,347	90.2	475,814	86.0	147,547	85.9
	Total	933,982		795,435		553,189		171,721	
Chrysler	Compact	3,144	1.7	47,130	24.4	63,058	44.5	16,278	40.5
	Conventional	183,260	98.3	145,587	75.6	78,578	55.5	23,921	59.5
	Total	186,404		192,717		141,634		40,199	
American Motors	Conventional	17,886	100	15,419	100	8,856	100	2054	50.0
Volkswagen	Compact	—		—		25,525	100	12,036	100

SOURCE: Motor Vehicle Manufacturers' Assn.

initially with one work turn apiece.

"There's a lot of excess conventional pickup truck capacity out there," Capolongo remarked. "We're pulling conventional capacity from Louisville because we can easily pick up the slack by adding a second shift to assembly lines at Ford's eight other truck plants." Components for the compact Ranger will be 90% sourced domestically.

A rundown of Ranger truck components sourced by country of origin, and by company of origin, reveals some interesting facts.

The Ranger's 2.0-L (122-in.^{3}) base gasoline four will come from Ford of Brazil; an optional 2.3-L (140-in.^{3}) gas four will come from Ford of Lima, OH; an optional 2.2-L diesel (134-in.^{3}) four will arrive from Toyo Kogyo of Japan about mid-1982.

Three-speed automatic transmissions will be sourced from Ford of Sharronville, OH; four-speed manuals from Toyo Kogyo; drive axles from Ford of Michigan; steering gear from Indiana; chassis from A. O. Smith; and suspensions from Bendix.

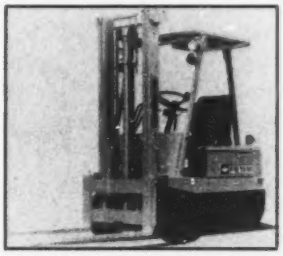
It's expected that Ford eventually will follow up its 1982½-model Ranger rear wheel drive with a four-wheel-drive version by 1984, one year after GM's anticipated 4wd proliferation of the S-series compact pickup.

Meanwhile, Ford's Capolongo told *TOHI* he's considering a 10% hike in mid-size commercial truck output at the Kentucky truck plant on one work shift due to a big rise in net incoming truck orders during the first three months of 1981. Ford's medium and heavy-duty truck plant near Louisville, KY continues to operate at 51% production capacity—4500 unit output each month. ■

Komatsu Enters Electric Forklift

by Nan S. Barbour

Komatsu Forklift (USA), La Mirada, CA, has introduced the FB15M three-wheel electric lift truck. The vehicle features a 3000-lb (1361-kg) load capacity and a maximum fork height of 118 in. (300 cm).



Komatsu Forklift's three-wheeled lift truck, model FB15M, features a hydraulic lift system with full filtration.

A solid state SCR on the FB15M provides infinitely variable speed control and fume-free operation. It is provided with a 48-volt electrical system. Rear wheel drive and steering require less electric power for longer operation between charges.

The 4770-lb (2164-kg) lift truck has an outside turning radius of 56.7 in. (144 cm). A one-piece floor plate allows for quick access to components, and a plug-in system analyzer is included for simplified troubleshooting. ■

Rockwell Intros New Axles

by Michael K. McCann

Rockwell wants the world to ride on its axles. It has recently introduced two new axles as enticement, the Easy Steer FF-941 and the high-load capacity FG-931.

(Continued)

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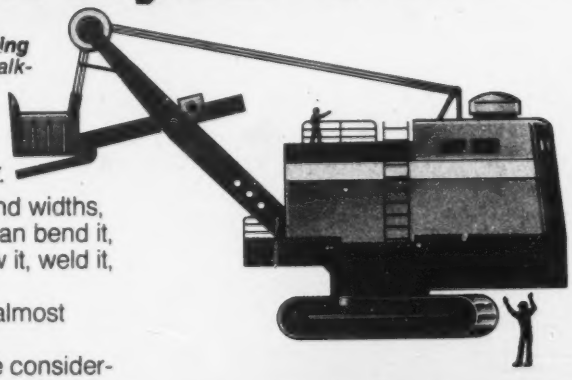

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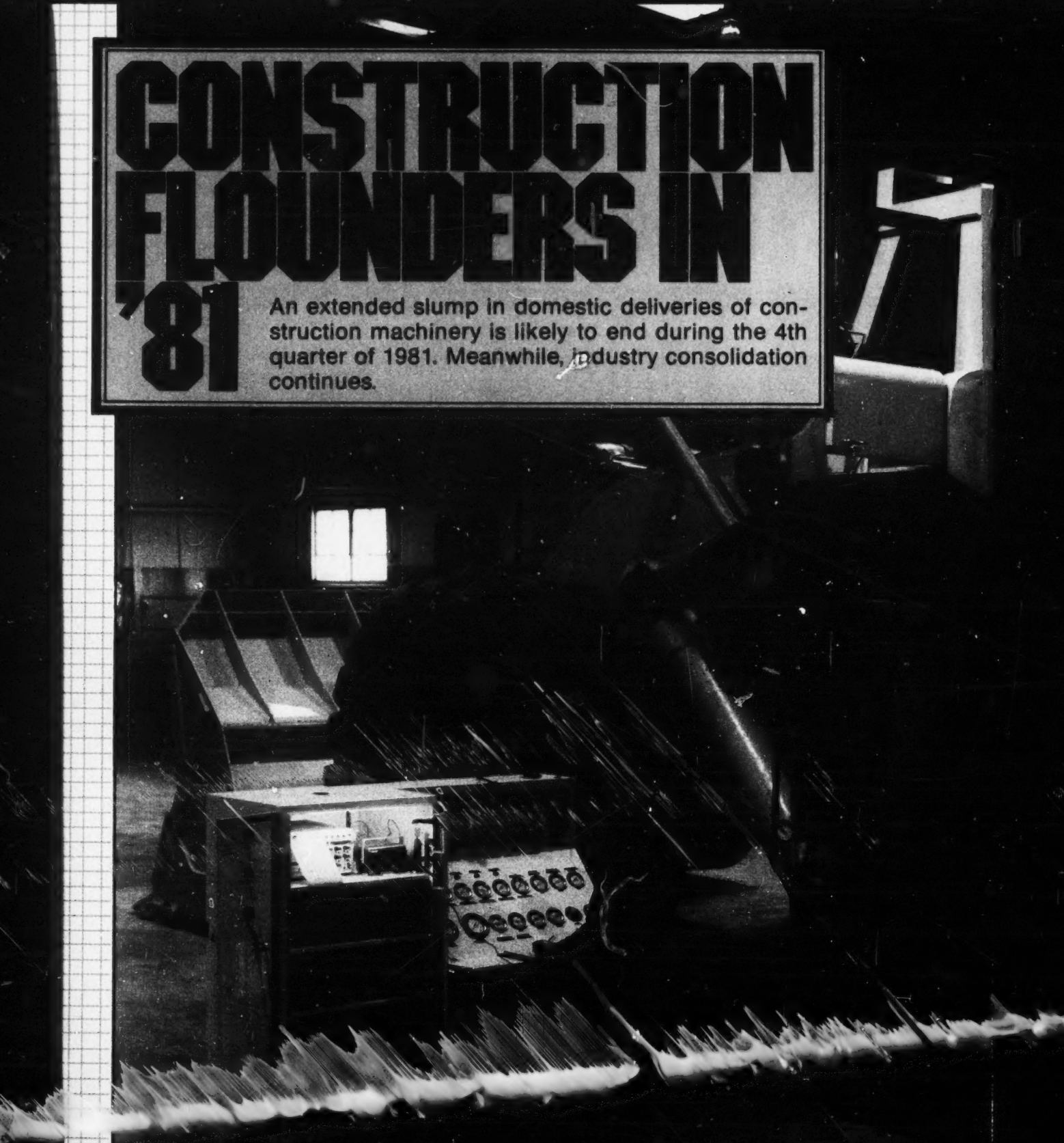
CONSTRUCTION FLOUNDERS IN '81

An extended slump in domestic deliveries of construction machinery is likely to end during the 4th quarter of 1981. Meanwhile, industry consolidation continues.



A fresh TOHI analysis of 1981 business for construction machinery shows actual domestic factory shipments slumping 6% to 98,700 vehicles before posting a late turnaround.

BEST AVAILABLE COPY

by John A. Stark

Danger signs are flickering in the construction machinery business as domestic shipments flounder in the third year of an unusually long and steep cyclical downturn.

According to an exclusive mid-year review of business by *Truck & Off-Highway Industries*, factory shipments of domestic equipment are expected to move ahead by just 4% to $11.4 billion this year, while the actual unit count drops 6% to 98,700 vehicles.

This mild downturn in business is compounded by a back-to-back plunge in vehicle output last year. Most domestic production was off 39% as the falloff spilled over into 1981. High interest rates from the Federal Reserve Board are to blame.

What's worrisome about this unmistaken trend in 1981 construction machinery business is the fact that another slash in demand for off-highway equipment could prompt further consolidation within the depressed industry.

Just recently, several low-volume builders of construction equipment pared vehicle output and consolidated business. They include International Harvester (trucks and industrial wheel tractors), Fiat-Allis (most motor graders and some scrapers), Clark (cranes, scrapers and motor graders) and Wabco (scrapers).

In addition, it's likely that more consolidation may occur within the low-volume, high-profit-margin ranks of excavators, scrapers and rear dump trucks. *TOHI* learned that most manufacturers embarked on highly competitive pricing tactics to cut substantial inventories of machinery assembled in late-1980. Lower factory output is in the works.

Caterpillar and Deere, for example, idled approximately 11% of their United Auto Workers workforce during the first three months of this year. J.I. Case trailed close behind with 19% while Harvester and Massey-Ferguson followed with 23% and 35%, respectively.

This indicates that unusually excessive amounts of light construction and industrial equipment exist in the industry's pipeline which, in turn, reflects extremely low demand for vehicles at the marketplace.

Domestic retail sales of construction machinery during the first three months of 1981 substantiate this state of business. Traditional high-volume items like industrial wheel tractors skidded 19% to 5500 units; crawlers (tractors and loaders) slipped 17% to 2300 units; and wheel loaders nosedived 28% to 1670 units. Compared to a corresponding year-earlier period, business obviously is soft.

Even low-volume machinery like hydraulic excavators failed to escape the downturn. Light equipment (55,000 lb and less) demand dropped 32% during the first two months while heavier excavators slid 15%.

Meanwhile, most industry manufacturers continue to follow price-leader Caterpillar with quarterly equipment price hikes averaging 3%-5%. Cat's yearly second quarter price increase of 3% on March 30, for example, was quickly followed by similar hikes at J.I. Case, Fiat-Allis, International Harvester, Terex/IBH and others.

Pricing tactics aside, *TOHI's* revised outlook for 1981 unit volume by type of equipment, size of equipment, horsepower and destination shows that the business year should end with domestic factory shipments of 98,700 vehicles (a 6½% drop), retail sales of about 69,600 machines (an 8% decrease), and exports of 29,100 units (a modest 3% downturn). Recovery is pegged at the start of 1982.

Recent action by Caterpillar at the factory confirm this outlook. Cat announced a limited recall of idle employees and boosted construction equipment production schedules for buildup of machinery inventories. It apparently expects an early 1982 turnaround in business.

A recent return of sky-high interest rates along with a tight money supply and big federal budget reductions from the Reagan administration toss cold water on a turnaround in off-highway business through most of this year.

An economist at the U.S. Dept. of Commerce told *TOHI*, "Domestic construction machinery business is dead. Year-to-date industry performance is utterly confusing with no establishment of trends or a rebound for 1981."

(Continued)

COPY

CONSTRUCTION

DOMESTIC PRODUCTION OF CONSTRUCTION EQUIPMENT TAKES A SPILL IN '81 (UNITS)

TYPE OF EQUIPMENT	1980 FACTORY SHIPMENTS	1980 RETAIL SALES	1980 U.S. EXPORTS	1981 FACTORY SHIPMENTS	1981 RETAIL SALES	1981 U.S. EXPORTS
CRAWLER TRACTORS	18,550	11,500	7,050	17,400	11,000	6,400
CRAWLER LOADERS	4,600	3,400	1,200	4,100	3,000	1,100
WHEEL LOADERS	16,580	11,000	5,580	15,500	10,500	5,000
SCRAPPERS	4,900	3,100	1,800	4,500	2,900	1,600
MOTOR GRADERS	9,580	5,000	4,580	8,200	4,200	4,000
REAR DUMP TRUCKS	2,470	1,300	1,170	2,900	1,300	1,600
LOG SKIDDERS	3,900	2,900	1,000	3,800	2,600	1,200
TRENCHERS/DITCHERS	10,350	7,800	2,550	9,700	7,400	2,300
IND. WHEEL TRACTORS	30,300	27,100	3,200	28,000	24,400	3,600
HYDRAULIC EXCAVATORS	4,400	2,400	2,000	4,600	2,300	2,300

SOURCE: TRUCK & OFF-HIGHWAY INDUSTRIES DATA

A revised outlook from the Commerce Dept. tends to substantiate this pessimistic assessment. The federal agency recently scaled back its original projection of 1.55 million housing starts to 1.2-1.3 million units for the year, compared to actual starts of 1.29 million units in 1980.

What's more, the Reagan administration reportedly is dismantling a Carter-instituted program for federal subsidization of middle income housing—virtually assuring little chance of a strong rebound in housing starts during the months ahead.

The consensus around the construction equipment OEM business is this—light construction and industrial machinery should continue to track domestic housing starts' ups and downs. *TOHI* has revised its original estimate (13.8% rebound) to a sluggish 6.3% increase in the dollar value of off-highway shipments for 1981. (This modest rise really represents a modest downturn in true unit volume.)

Deere's C.B. Reynolds, vice president-marketing, Industrial Equipment Div.; International Harvester's J. E. Monge, vice president-marketing, Construction Equipment Group; and Terex/IBH's D. B. MacLaren, director of marketing, North & South America foresee anywhere from a 10% to 15% drop in industrial wheel tractor shipments.

The revised outlook is slightly better for crawler tractors, crawler loaders, wheel loaders, excavators and skidders. Deere, Harvester and Terex expect deliveries to range across the board, from a 20% decrease to flat growth.

We project retail sales of crawler tractors at 11,000 units for 1981, a 4% drop; crawler loaders should drop 12% to 3000 vehicles; wheel loaders may slip 4½% to 10,500 machines; hydraulic excavators could show a 4% erosion to 2300; and log skidders may fall by 10% to 2600 units.

For roadbuilding-type machinery commonly found at highway construction sites and other public construction works like sewer and water projects, a revised 8% decline in dollar outlays for this equipment is likely in 1981.

Cutbacks in federal spending for new highway construction definitely shoulder much of the blame. The Commerce Dept. reported it recently revised expected federal expenditures for highways to $13½-$15 billion, which represents flat growth in constant dollars.

Worsening the long-term outlook for highway construction is this—federal aid in this sector continues a trend of flat (unadjusted for inflation) growth while incoming revenues to the sacred federal highway trust fund dwindle.

Other federally-funded public construction activity (dam building, land improvement, sewer and water projects and sanitary landfills), however, appear to be surviving budgetary cuts. The nation's Commerce Dept. is sticking to its original forecast of $18.2 billion in outlays for 1981. But this barely keeps pace with a year-to-year inflationary rate of 15%.

Deere's Reynolds, IH's Monge and Terex's MacLaren anticipate varying year-end results of 10%-15% decline in domestic retail sales for motor graders, and flat growth to a 5% dip for scrapers.

According to *TOHI's* revised outlook of the construction equipment industry for 1981, scraper demand may decline by 6% to 2900 unit sales, and motor graders could nosedive 16% to 4200 sales.

For heavy surface mining-type machinery, we estimate a revised flat growth in dollar outlays for this equipment during the year—another modest slump in deliveries of assembled vehicles. Blame it on a lengthy springtime walkout by more than 160,000 coal miners.

According to the nation's Dept. of Energy, strike-related coal output above and below the surface already is off 80 million tons. Thus, it's likely that production increases

WHEEL LOADERS

	1980 UNITS	1980 TOTAL	1979 UNITS	1979 TOTAL
CATERPILLAR	4,180	38%	5,935	36%
J. I. CASE	1,650	15%	1,650	10%
INT'L HARVESTER	990	9%	2,310	14%
CLARK	990	9%	1,815	11%
JOHN DEERE	990	9%	1,650	10%
FIAT-ALLIS	990	9%	1,320	8%
FORD	440	4%	825	5%
TEREX/IBH	220	2%	329	2%
EATON-YALE	220	2%	328	2%
OTHERS	330	3%	328	2%

NOTE: UNITS REPRESENT U.S. RETAIL SALES
SOURCE: TRUCK & OFF-HIGHWAY INDUSTRIES DATA

INDUSTRIAL WHEEL TRACTORS

	1980 UNITS	1980 TOTAL	1979 UNITS	1979 TOTAL
J. I. CASE	9,500	35%	13,500	30%
JOHN DEERE	6,240	23%	8,550	19%
FORD	5,960	22%	15,300	34%
INT'L HARVESTER	24500	9%	2,700	6%
MASSEY FERGUSON	2,170	8%	4,050	9%
JCB	270	1%	400	1%
HY-DYNAMIC	270	1%	300	—
OTHERS	240	1%	200	—

NOTE: UNITS REPRESENT U.S. RETAIL SALES
SOURCE: TRUCK & OFF-HIGHWAY INDUSTRIES DATA

CRAWLER LOADERS

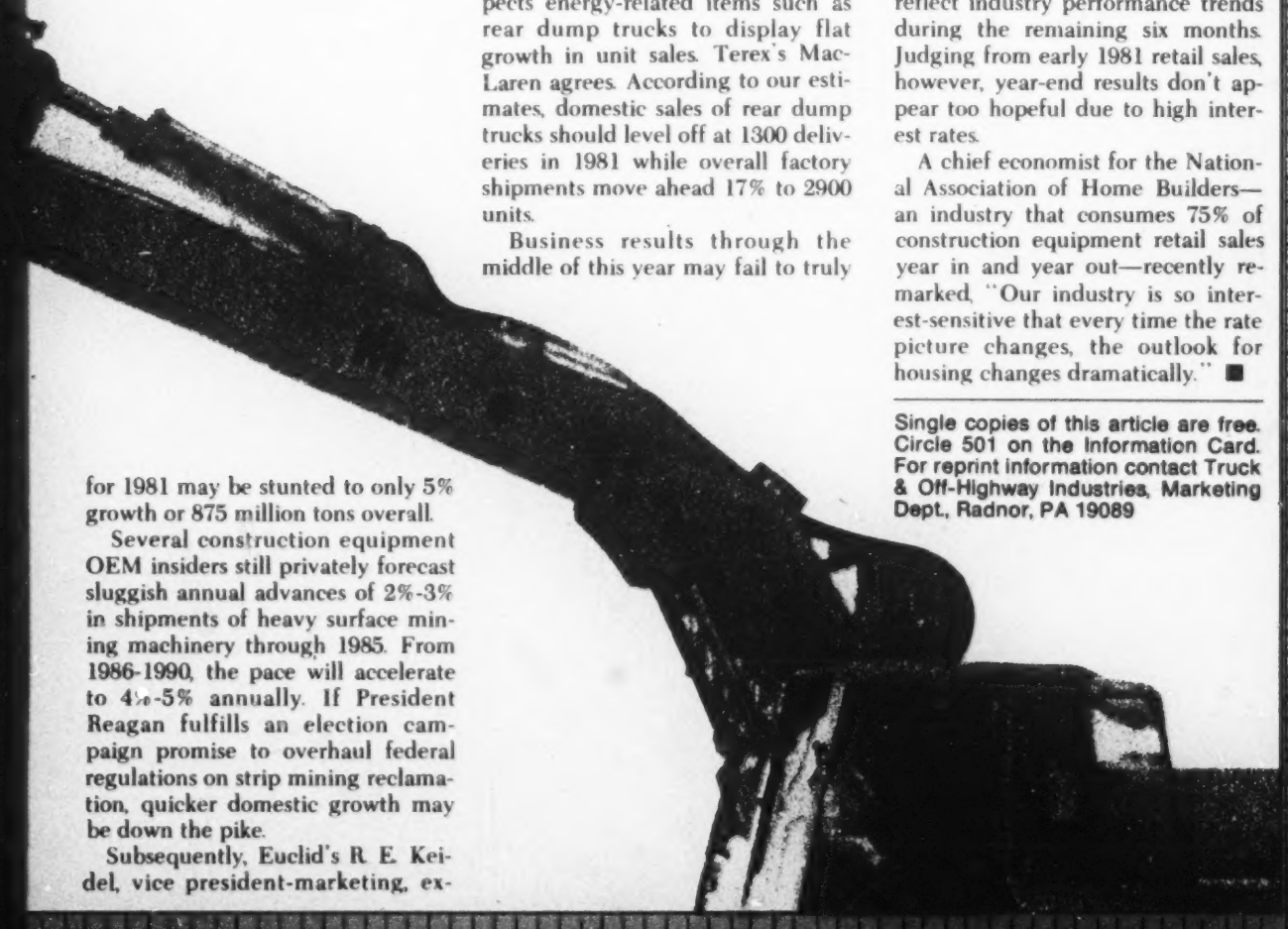
	1980 UNITS	1980 TOTAL	1979 UNITS	1979 TOTAL
CATERPILLAR	1,320	39%	2,810	41%
JOHN DEERE	880	26%	1,650	24%
J. I. CASE	680	20%	1,100	16%
KOMATSU	170	5%	340	5%
INT'L HARVESTER	170	5%	480	7%
MASSEY-FERGUSON	100	3%	270	4%
FIAT-ALLIS	80	2%	210	3%

NOTE: UNITS REPRESENT U.S. RETAIL SALES
SOURCE: TRUCK & OFF-HIGHWAY INDUSTRIES DATA

CRAWLER TRACTORS

	1980 UNITS	1980 % TOTAL	1979 UNITS	1979 % TOTAL
CATERPILLAR	5,060	44%	8,680	48%
JOHN DEERE	1,950	17%	3,800	21%
J. I. CASE	1,720	15%	2,540	14%
KOMATSU	1,270	11%	250	2%
INT'L HARVESTER	800	7%	1,450	8%
FIAT-ALLIS	350	3%	900	5%
TEREX/IBH	230	2%	240	1%
MASSEY-FERGUSON	120	1%	240	1%

NOTE: UNITS REPRESENT U.S. RETAIL SALES
SOURCE: TRUCK & OFF-HIGHWAY INDUSTRIES DATA



for 1981 may be stunted to only 5% growth or 875 million tons overall.

Several construction equipment OEM insiders still privately forecast sluggish annual advances of 2%-3% in shipments of heavy surface mining machinery through 1985. From 1986-1990, the pace will accelerate to 4½-5% annually. If President Reagan fulfills an election campaign promise to overhaul federal regulations on strip mining reclamation, quicker domestic growth may be down the pike.

Subsequently, Euclid's R. E. Keidel, vice president-marketing, expects energy-related items such as rear dump trucks to display flat growth in unit sales. Terex's MacLaren agrees. According to our estimates, domestic sales of rear dump trucks should level off at 1300 deliveries in 1981 while overall factory shipments move ahead 17% to 2900 units.

Business results through the middle of this year may fail to truly reflect industry performance trends during the remaining six months. Judging from early 1981 retail sales, however, year-end results don't appear too hopeful due to high interest rates.

A chief economist for the National Association of Home Builders—an industry that consumes 75% of construction equipment retail sales year in and year out—recently remarked, "Our industry is so interest-sensitive that every time the rate picture changes, the outlook for housing changes dramatically." ■

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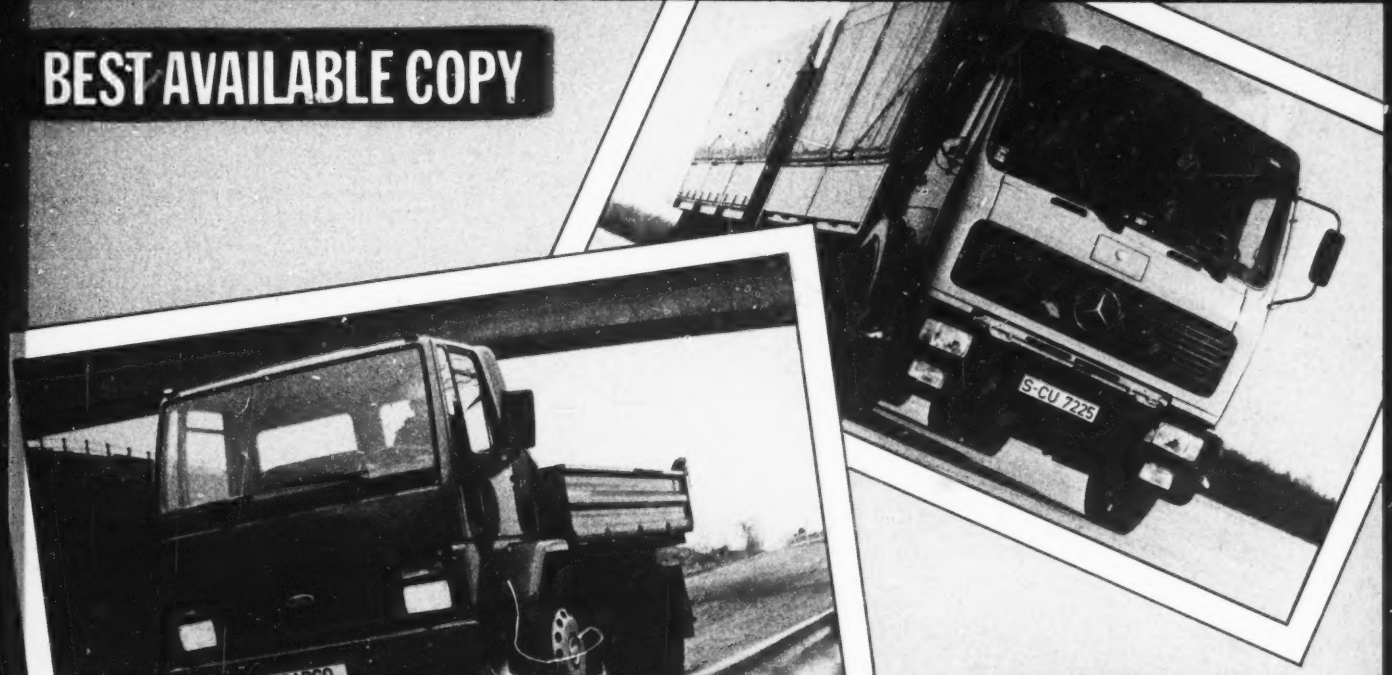

The slump in European truck business has failed to postpone new model entries from Ford, Daimler-Benz and Daf.

EUROPEAN TRUCKS

NEW MODELS IN A DOWN MARKET

While the US enters early stages of recovery in the truck business, a big downturn looms in Europe. Despite this, several European truckmakers have recently introduced new, modern vehicles.

by John A. Stark

The European truck business appears to be on the verge of another major industry shakeout as low-volume truckmakers scramble at the factory to offset sharp cyclical downturns at the marketplace.

In France, truck demand recently took a turn for the worse while commercial vehicle builders pared output by roughly 15%. It prompted the federal government to rush to the industry's rescue with $1 billion contracts for 42,000 trucks from Renault Vehicules Industriels (RVI), Peugeot and others.

Shortly afterward, profitable RVI rescued Peugeot's commercial vehicle business by agreeing to take over 50% ownership and management of Talbot's (formerly Chrysler's) Dodge Trucks for $29 million. It merged commercial truck operations between the two assemblers.

Peugeot trouble at Talbot's Dodge Trucks stems, for the most part, from havoc in the United Kingdom where one of its two primary truck manufacturing facilities is located. In 1980, industrywide UK truck output dropped 5% to 389,170 vehicles while truck sales plunged 23%. It led to a frightening buildup of in-

EUROPEAN TRUCKS

In a major truck production move, Ford overhauled UK assembly lines, automated truck cab fabrication and rearranged feeds in the cab painting process for its new cabover models.

ventories, particularly for Talbot whose production schedules were off just 7% to 16,334 trucks during the same period.

Other lower volume commercial vehicle builders in the UK fared much worse. Fodens and Stonefield went down the tubes, although US-based Paccar eventually bought bankrupt Fodens for $39.9 million.

Meanwhile, ERF hangs on for dear life. And International Harvester affiliate Seddon-Atkinson closed one of its two local production facilities in an apparent effort to limit buildup of truck inventories.

Even high-volume truckmaker BL Ltd. of the UK continues to reduce production schedules at its new $53 million heavy truck assembly complex in Lancashire, England following early 1981 restructure of its entire commercial vehicle operations.

Late last year, Leyland slashed outlays by 42% for a new technical center and test track at its Lancashire site. Odds are it foresees little turnaround in the UK truck business this year. Some estimates project another 22% downturn in vehicle demand, the lowest count in 30 years.

More significant, however, is the fact that BL's Leyland Vehicles continues to pare production output at its modern Lancashire complex in the wake of back-to-back new medium and heavy-duty truck model (T45 Series) introductions.

New truck launches generally tend to spur demand for respective vehicles in a depressed marketplace which, in turn, offsets losses in production volume elsewhere.

It apparently is a coincidental but key reason why other European truck assemblers like Ford Trucks (UK), Daf (Holland), Daimler-Benz (West Germany) and Scania (Sweden) just yanked the wraps from major new lineups of medium and heavy-duty commercial vehicles.

Europe's leading manufacturer of trucks, Ford Trucks, invested $200 million to redesign its 16-year-old D-Series vehicles and retool its Langley, England assembly operations to produce 12 new cabover models at 250 units daily.

To make way for the renamed 'Cargo' trucks, Ford sunk $18 million into new automatic robot welding of cabs, adding another $18 million for installation of computerized gear cutting machines to produce rear axle components elsewhere.

Ford also set up a new 19-stage cathodic paint process at Langley, and added new computer-controlled quality assurance steps to the vehicle assembly process. Now, a large three-dimensional measuring gauge checks for errors in Cargo

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EUROPEAN TRUCK PRODUCTION BY MANUFACTURER, BY COUNTRY

UNITED KINGDOM	1978	1979	1980
Leyland	131,478	124,656	129,632
Vauxhall (GM)	117,443	87,650	96,424
Ford	106,472	167,248	138,373
Talbot (RVI)	17,617	17,597	16,334
Seddon-Atkinson (IH)	5,241	4,716	2,943
ERF	3,031	3,158	1,811
Fodens (PACCAR)	1,568	1,675	1,340

FRANCE	1978	1979	1980
Renault (RVI)	131,143	141,046	166,760
Peugeot (TALBOT)	144,074	111,017	127,428
Citroen (RVI)	55,497	48,251	49,034
Saviem (RVI)	30,733	29,101	54,086
Berliet (RVI)	18,215	16,718	—
Unic (IVECO)	16,658	18,646	17,809
Sovam	118	133	113
C.B.M.	112	106	105

SWEDEN	1978	1979	1980
Volvo	29,944	33,499	35,405
Scania	21,334	24,781	27,675

WEST GERMANY	1978	1979	1980
Daimler-Benz	157,026	171,656	188,392
Volkswagen	93,067	92,450	114,591
MAN	20,364	21,225	24,317
Magirus-Deutz (IVECO)	18,865	20,184	20,619
Opel	3,799	8,223	6,137
Faun-Werke	602	349	485

ITALY	1978	1979	1980
Fiat (IVECO)	128,045	130,854	145,016
OM (IVECO)	12,662	13,713	16,449
Magirus-Deutz (IVECO)	3,711	4,263	2,952
Alfa Romeo	3,098	2,036	1,672

SPAIN	1978	1979	1980
Motor Iberica	29,553		27,106
Ensa (IH)	18,009	NOT AVAILABLE	15,550
Talbot (RVI)	18,565		4,123
Mevosa	14,490		10,367
Ford	7,031		5,834
Seat	3,623		4,096

NOTE: UNIT COUNT INCLUDES ALL COMMERCIAL VEHICLE OUTPUT
SOURCES: EUROPEAN TRADE ASSOCIATIONS

cabs, frames and components.

Along with the 12 new cabover truck models, Ford introduced an unprecedented 28 new side frame members and 24 new underbody cab panels to accommodate various combinations of six diesel engines and six transmissions.

Ford truck designers used two different sizes of engine tunnels to accommodate inline and V-shaped engine families. Tunnels are lined with rubber and mineral-loaded foam to muffle interior truck noise to 80 dB(A).

Ford also cut truck weight by 30% with a new chassis frame design for the 6-28½ ton Cargoes, while reducing vehicle drag by 35% with the deployment of spoilers above and beneath the cab.

Meanwhile, Ford plans to invest approximately $290 million by 1983 to update and retool its medium-duty truck assembly site at Genk, Belgium. It may be instrumental in helping Ford to retain Europe's leadership role as top seller of commercial vehicles. The truckmaker sold 179,600 trucks last year for 13% share of the business.

In medium and heavy trucks, however, Ford trails three main rivals (Daimler-Benz, Iveco and RVI, respectively). Daimler's strength is rooted to its West German home turf where the firm controls 51% of annual truck sales.

Yet, even though Daimler outdistanced Iveco (Magirus-Deutz) and Maschinenfabrik Augsburg Nurnberg (MAN) last year by extremely wide margins in Germany, business ebbed. Daimler's share slipped 2% as overall commercial vehicle output jumped 13% to 357,600 units—Europe's healthiest market.

Slippage doesn't mean a tumble, however. Daimler recently started producing two new basic families (four new models) of heavy cabover trucks at Woerth, West Germany. All vehicles come equipped with Daimler-built diesel engines and axles.

Specific production plans for the new trucks (models 1625, 1628, 1633 and 1638) are unavailable but it's understood that models to be assembled range from 16 to 26 tons. They're powered by 250 hp to 375 hp big-bore V-8s.

Amidst a downturn in the French and Dutch truck business, Daf Trucks of Holland (another Harvester affiliate) shifted focus to export markets with the launch of new 32-ton N2800-Series commercial vehicles. Low volume production is expected at Eindhoven where just 250 units will be built this year. Output should reach 600 trucks annually by 1983.

Interestingly, Daf's new conventional trucks will come fitted with Iveco (Magirus-Deutz) cabs built in West Germany, plus plastic hoods and fenders.

Daf said these 230-320 hp 'severe-duty' trucks are designed to take drivetrain abuse in export markets. Two diesel engines and a common eight-speed mechanical transmission will be offered.

Elsewhere at Eindhoven, Daf plans to expand manufacturing capacity for trucks from 16,000 to 17,500 units yearly. (It produced 16,062 trucks in 1980.) Engine capacity is being expanded from 18,000 to 22,000 units annually. (It manufactured 17,864 engines last year.)

It may be ironic but other low and high-volume producers of trucks such as Volvo are having serious difficulties weathering big downturns in European business. Over-expansion of production capacity nailed Fodens to the wall. Further shake ups may occur. ■

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Chilton's

TRUCK & OFF-HIGHWAY INDUSTRIES

September 1981

AGRICULTURAL MACHINERY

s A Turnaround At Hand?

Productivity Fights World Hunger

mergence Of Specialized Mowing Equipment

September, 1981

TRUCK & OFF-HIGHWAY INDUSTRIES

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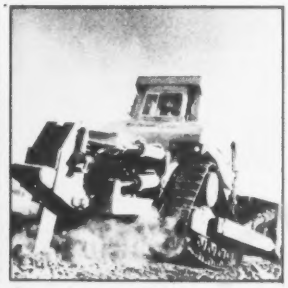

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Sunrise or sunset for the farm machinery industry? *TOHI* charts the trends.

NEXT ISSUE

October looks at the latest developments in adiabatic, turbocompound diesels plus the design aspects of steerable front drive axles.

TRUCK & OFF-HIGHWAY INDUSTRIES (USPS 461-290) magazine is published bimonthly (Jan/Feb, Mar/Apr, May/June, July, Aug, Sept, Oct, Nov, Dec) by Chilton Co., Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies Inc., New York, NY. Subscription prices: United States—$20.00 per year, $38.00 for 2 years; Canada and Foreign—$50.00 per year. Air rates on request. Single copies and back issues on request. All subscription orders must be accompanied by cash or check along with complete information for classification, including title of the individual and the product the company manufactures. 2nd class postage paid at Philadelphia, PA 19104 and additional mailing offices. POSTMASTER: Send address changes to TRUCK & OFF-HIGHWAY INDUSTRIES, P.O. BOX 2055, Radnor, PA 19089. ©Chilton Company, 1981.

Ford To Launch New Farm Tractors Around The Globe

by John A. Stark

Ford Motor Co., Dearborn, MI, second largest retailer of farm tractors in the nation, is on the verge of launching output of a new family of two-wheel-drive farm tractors throughout the world next month.

Ford vice president and division general manager M. H. Manning confirmed a report to *TOHI* that Ford recently started pilot production of a new Series-10 family of ten 30-90 hp 2WDs at Romeo, MI.

Final production of the high-volume, low-horsepower buggies is set for next month at Romeo, trailed by output at about five other assembly sites around the globe. Ford also plans to produce 10 new models of industrial wheel tractors on the same assembly lines.

Ford Tractor Operations reportedly invested $100 million to develop the new vehicles and retool all of its world manufacturing network. Hence, the new Series-10 tractors will likely become the most extensive, most expensive single product launch in the firm's farm machinery history.

Said Manning, "These new 2WDs couldn't have arrived at the marketplace at a better time. With national and worldwide farm tractor volume forecasted for recovery in 1982, Ford expects to capitalize on the rebound with a new lineup of innovative products."

Ford Tractor general manager M. H. Manning confirmed plans to start worldwide production of new, bread-and-butter 2WD farm tractors next month. Brazil will become an important source of engines for these vehicles.

Ford's business strategy for the next cyclical upturn isn't alone in the industry. John Deere, International Harvester, Massey-Ferguson and Versatile all plan to unveil a new, wide array of 2WD and 4WD farm tractors and axial flow combines this fall or early next spring for a similar purpose.

In addition to new 2WD farm tractors, Ford's Manning said his firm "just launched a new engine line at [Ford's farm tractor] assembly complex in Brazil." The producer expects to manufacture 20,000 engines (two models with three and four cylinders) there during the first year of production. By late 1982, production is targeted at 40,000 units yearly.

Most of these new 30-90 hp engines from Ford's newest Brazilian source, as well as from the company's United Kingdom engine production complex, will end up beneath the hoods of Ford's new family of 2WD Series-10 farm tractors.

It's expected that engine output from Brazil will primarily power farm tractors assembled there for either local or export markets. "Engine production in Brazil enables Ford to be more cost competitive with Brazilian-assembled farm tractors," Ford's chief division officer said.

Recent reports from Brazil indicate that Ford has just become the leading producer of farm tractors in that nation.

"We've been shipping Brazilian-built tractors into a number of Asian and African markets," Manning remarked. "So this new Brazilian source of engines enhances our strategy. It's possible we could export Brazilian-assembled engines to the US for installation in 2WD farm tractors at Romeo.

"But our plans at the moment pre-empt this. We will use local Brazilian engine assembly capacity for locally produced vehicles destined for Brazil and for export." According to Manning, "There's no excess capacity in Brazil at the present time to dispatch engines to the US."

Ford's vertical integration strategy in the global high-volume business of 2WD farm tractor manufacture, however, is sharply contrasted by its approach to the production of lower-volume 4WD tractors and self-propelled combines.

Under separate agreements with 4WD producer Steiger and combine assembler Claas of West Germany, Ford has elected to outsource manufacture of these highly capital-intensive vehicles to more wisely reinvest into higher-volume 2WD farm tractor business, for a more profitable return. "We're proficient at the 2WD farm tractor manufacturing business," Manning added.

According to Manning,

(Continued)

World Farm Tractor Business Outlook By Country

	1981		1980	
	UNITS	% TOTAL	UNITS	% TOTAL
US	192,000	24%	182,000	21½%
FRANCE	50,000	6%	65,000	8%
WEST GERMANY	45,000	5½%	45,000	5%
UK	18,000	2%	29,000	2½%
OTHERS	495,000	62½%	519,000	63%
TOTAL WORLD	800,000	100%	840,000	100%

NOTE: UNITS REPRESENT FACTORY SALES OF ALL FARM TRACTORS, EXCLUDING INDUSTRIAL WHEEL TRACTORS
SOURCE: FORD MOTOR CO.; TOHI ESTIMATES

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global farm tractor business in 1981 should be off by roughly 5% to 800,000 units with factory sales of 18,000 units in the UK; 45,000 vehicles in West Germany; about 50,000 tractors in France (Europe's largest tractor-producing nation) and nearly 220,000 units (including industrial wheel tractors) in North America.

"European business is very weak," the Ford vice president said. "Industry production volume during 1980 was the lowest it has been since World War II. I believe it could be worse in some of those countries [i.e. France and the UK] this year. As a result, it's likely that overall European volume for 1981 could equal US factory sales volume of about 220,000 vehicles.

"In 1982, I wouldn't be surprised to witness an industry-wide increase of 10%-15% in sheer unit volume of farm tractor sales, based upon a relatively flat farm machinery year through December," Manning disclosed.

He also pointed out that Ford's current farm tractor production capacity network around the world "is adequate for the demand we foresee during the near-term.

"We have some plans in the works to break bottlenecks [reorganizing production line feeds, etc.] in the manufacturing and assembly processes, but nothing of major consequence. We won't be mothballing production capacity." ■

Synthetic Oil Does It All

by John McElroy

After four years of R&D, Pillsbury Chemical & Oil Co. of Detroit, MI has announced what they claim is a major breakthrough in synthetic oil technology.

The new 5000 Series oil can be used as a high water base hydraulic fluid, a gearbox lubricant, a slide and way lubricant, and a cooling/cutting lubricant. According to Pillsbury, 5000 Series meets all current and pending EPA and OSHA standards.

Robert K. Rauth, president of Pillsbury, says, "As a machine lubricant, the solution is used undiluted. As a hydraulic and coolant fluid, it is reduced with water. If there is a leakage of the hydraulic or lubricant fluid into the coolant, the problem of tramp oil contamination doesn't occur. In fact, lubricant leakage actually enriches the coolant."

With the 5000 Series there is no need to dump central coolant systems on a regular basis. There is also no need for water treatment. "Systems last for years, even with very hard water dilution," says Rauth.

At $4.30/gal. ($1.13/L), the 5000 Series is considerably more expensive than oil, which costs $1.71/Gal. ($.45/L). But the 5000 Series can reportedly save the operator of a 10,000-gal. (37,854-L) transfer line cooling system over $3000 a year in operating costs. ■

Computer Nut-Runner Saves Time

by Peter T. Mullins

Saab-Scania, one of Swedens two major truckmakers, has installed a sophisticated computer-controlled nut-runner in its gasoline engine plant in Sodertalje, south of Stockholm.

The nut-runner uses the MACS system developed by Atlas Copco. MACS uses a microprocessor which monitors the tightening process and enables each bolt to be tightened into its plastics range. This is claimed to obviate the need to re-tighten after test running the engine. Production schedules reportedly have been improved.

During tightening, each of the ten spindles feeds digital information on torque and angle to the microprocessor. The control system is programmed to detect when the plastic range of the bolt material is reached. Tightening ceases when a predetermined torque value is obtained.

In addition to controlling torque, the system can detect errors—forgotten washers, the presence of dirt or foreign matter, or thread faults.

Introducing the new nut-runner has enabled Scania to fit camshaft cover, distributor and ignition cables and tighten cylinder head bolts in the short time of ten minutes per engine. ■

Ford Brasil Ups Output

by Jaures S. Mazzone

Ford Brasil S/A Operacoes de Tratores has churned out 7223 tractors at its Sao Paulo assembly site during the first semester of this year. That figure puts Ford's Brazilian tractor operation ahead of Massey Ferguson's Brazilian facility in terms of units produced.

Ford Brasil is also the leader in exports and now accounts for 76% of the agricultural tractors sold overseas. A Ford spokesperson said that Ford trails in domestic sales in Brazil, since approximately 50% of the tractors assembled there are exported. ■

DDA's Fuel Pincher Line Expands

by Nan S. Barbour

A lower horsepower version of Detroit Diesel Allison's 8.2-L (500-in.^{3}) Fuel Pincher diesel engine has hit the market. And according to tests done by DDA, the new Fuel Pincher can nearly double the economy of equivalent gasoline engines.

Designed for medium truck and bus chassis, the new 130-hp V-8 handles applications up to 20,000 lb (9072 kg) GVW. The latest addition will be available in naturally-aspirated configuration only. DDA will continue to offer the higher horsepower Fuel Pinchers (165- and 250-hp) in both naturally aspirated and turbocharged versions.

All 8.2-L Fuel Pincher models come with a 24-month or 50,000-mi (80,465-km) warranty that covers complete cost of replacement parts and labor during that period. The newest Fuel Pincher is now available in GMC, Chevrolet and Ford mid-range truck and bus chassis. ■

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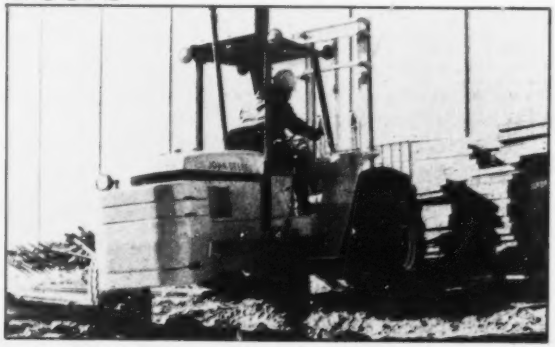
Deere



Powered by a John Deere 4-cylinder diesel delivering 52 hp, the new John Deere 480C forklift offers improved mast mounting for stability on rough terrain, and a mast option with 7 ft (2.1 m) of freelift.

by John A. Stark

Global hunger is spreading, but farm equipment OEMs can do something about it.

Third world (developing) nations continue to consume less and less of a percentage of total cereal per capita while they place more land into agriculture to feed a growing populace.

From 1960 to 1980, for example, worldwide cereal consumption grew by 0.9% annually, but third world increases of 0.2% failed to reach parity.

This 20-year trend toward lower comparative food consumption for developing countries occurred despite the fact that they placed 12% more land into crop production each year (albeit poorly managed) to support a population growing 3½% annually.

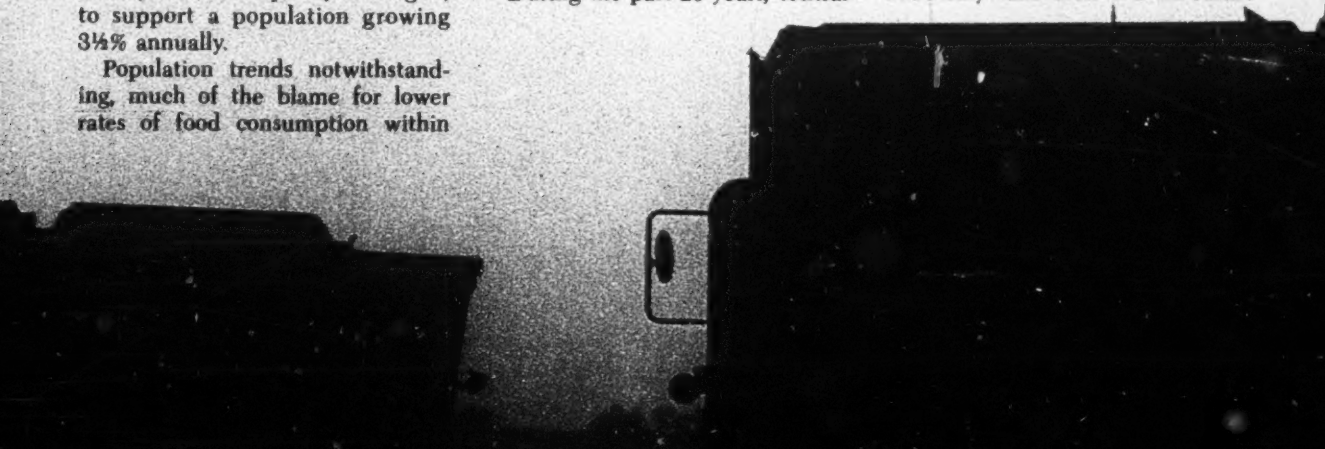
Population trends notwithstanding, much of the blame for lower rates of food consumption within the third world can be laid at the doorsteps of centrally planned (Communist) nations, not developed countries like the US, Canada, Brazil and Australia where mechanization on the farm has boosted crop yields by roughly 21% annually.

Centrally planned nations with stagnant agricultural systems, for instance, out-consumed third world counterparts by 223% last year, highlighting a compounded 20-year cereal consumption rate of 2.3% yearly. What this essentially does is dry up or contract the pipeline supply of wheat, corn, coarse grain and other items available for export from mechanized systems in the West.

During the past 20 years, centrally planned regions of the world virtually placed no new land into agricultural use. Yet their overall population grew by 1.7% each year to 1.4 billion people.

Massey-Ferguson's Ralph Ramsay, vice president of engineering, apparently hit the nail on the head when he told *Truck & Off-Highway Industries*, "There's absolutely no reason why Comecon [centrally planned] nations can't become self-sufficient in food production. It's a complete mismanagement of their agricultural system that's to blame." Other farm OEM designers agreed.

According to Ford's Dr. B. J. Lamp, general marketing manager, "Rising production costs will undoubtedly take their toll on future



world agricultural output. Irrigation is the key to major food production increases in many temperate and tropical countries. Yields have increased significantly with irrigation and associated practices."

Nonetheless, Lamp pointed out that, "By the year 2000, some 30 countries are expected to have a demand for water that exceeds their maximum sustainable supply. And the amount of investment required to develop water resources often exceeds the economic ability of many countries.

"Success in solving the problem of adequately sustaining each country's well-being," he added, "ultimately rests in the hands of the people who eat that country's food and [in its] population policies. What may be the answer is the use of incentives or controls to reduce the birthrate and/or an increase in agricultural productivity."

"By increasing farmers' productivity," International Harvester's Dr. R. J. Potter, senior vice president and chief technical officer, said, "farmers help contribute to lower cost food output, [and to] more food in the US and for export around the world. It's a direct consequence of our [design engineers] doing a better job that the farmers of the world can feed more people with less production costs and less fuel consumption."

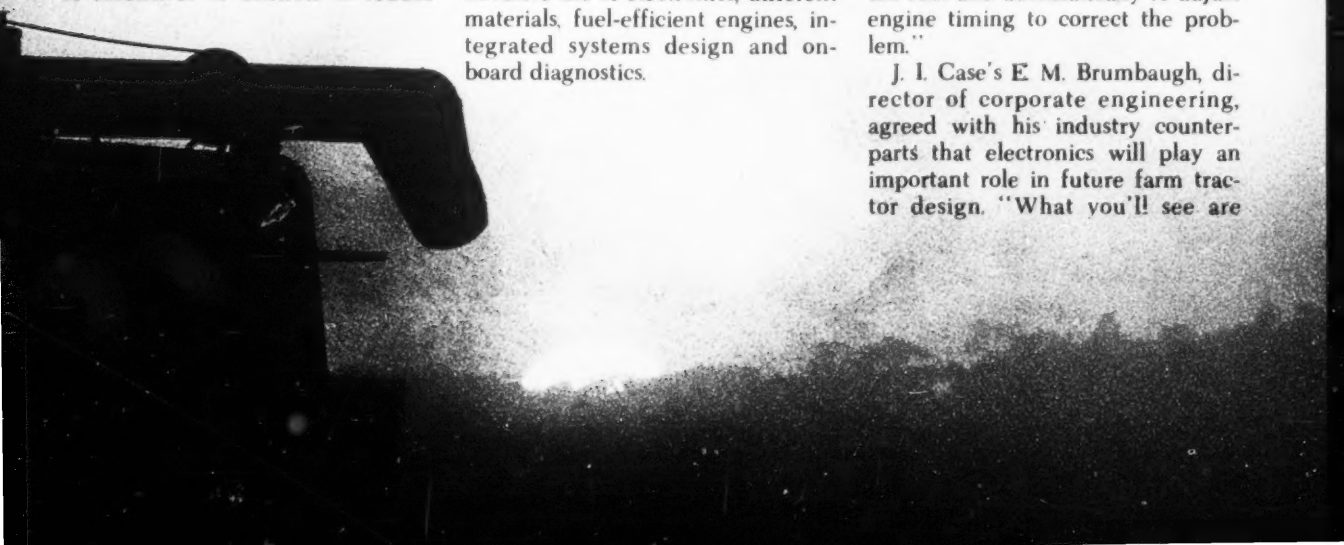
Harvester's Potter identified major design innovation as one approach. "Another approach is to take that farm tractor and tune it with additional features and characteristics to make it even more productive. Examples of that are innovative use of electronics, different materials, fuel-efficient engines, integrated systems design and onboard diagnostics.

"Other companies have been involved in bringing electronic controls into their farm machines for some time," he remarked. "We're going to attempt more dramatic things by leap frogging."

Massey's Ramsay indicated that mechanical-hydraulic fuel injection systems commonly found on today's farm tractor diesel engine may soon be controlled electronically. "Once you have that piece in place, it can be interlinked to a wheel slip monitor to automatically reduce wheel tractor slippage by instantly regulating fuel input to the engine.

"Fuel degradation is a problem in third world countries. Once we [the farm OEM industry] have electronic fuel injection aboard farm tractors, it's possible we could electronically diagnose the quality of the fuel and automatically re-adjust engine timing to correct the problem."

J. I. Case's E. M. Brumbaugh, director of corporate engineering, agreed with his industry counterparts that electronics will play an important role in future farm tractor design. "What you'll see are



World Hunger

Ford's latest 2WD tractor family, the Series-10, will make its world debut later this year.

more electronic systems mated to a master microprocessor to handle multiple functions on the vehicle. Some of these functions include steering, draft control, transmission control, governor control and timing to obtain optimum fuel efficiency from the powerplant."

Brumbaugh added, "The future farm tractor may come equipped with a programmable transmission. In our type of business, we need a controllable [non-conventional automatic] transmission—one that's programmed to automatically do what the operator wants it to do."

Draft control systems are another example. What these systems do is sense draft loads and unload the vehicle to minimize wheel slippage. "With electronics," he explained, "this can be accomplished more accurately."

In developing third world nations, more and more front wheel assists are being equipped on lower-cost 2WD farm tractors to help overcome the problem of wheel slippage under load. And it appears that this trend is here to stay.

"Front-wheel-drive farm tractor designs that will materialize in the next three to four years are going to be much improved in terms of packaging on the vehicle," Ford's W. J. Howard, executive engineer, Advanced Engineering, remarked.

"Previous designs limited the machine in turning radius as the assists on the front end were large and bulky. In the future, they'll be incorporated as part of the basic vehicle, rather than as an add-on, which is how assists first made a big splash," he said. "Once you achieve that design goal, farm tractors with 2WD can be packaged much more neatly."

In the past three to four years, there's been about a 10% increase in 2WD farm tractors imported to the US from Europe with front wheel assists. In fact, approximately 14% of all 2WD farm tractor retail sales in the US last year contained front wheel assists—a 3% increase in one year.

"Front wheel assists make a farm tractor more adaptable to adverse operating conditions in developing countries," Ford's W. A. Gottman, agricultural product planning department chief, added. "These types of adverse conditions are mostly inherent to third world nations, rather than the US."

There's more than one way to increase traction, however. "We [Ford] went to dual wheels a number of years ago to get added traction during the spring," Ford's Howard stated. "But dual wheels are still a pain in the neck to use. Since farmers are now more concerned about labor rates and overall productivity, use of duals could lose favor under certain conditions, at the expense of front wheel drives."

Global Population Growth Continues

Type Of Countries	1960	1980	2000	Yearly Increase 1960-1980	Yearly Increase 1980-2000
Developed	630	766	892	1.1%	0.8%
Third World	1321	2232	3688	3.5%	3.3%
Centrally Planned	1035	1375	1673	1.7%	1.1%
Total World	2986	4373	6253	2.3%	2.1%

note: Unit Count Is By The Millions
source: USDA, FAO

Global Cereal Consumption Edges Up

Type Of Countries	1960	1980	Yearly Increase
Developed	1029	1209	1.0%
Third World	396	408	0.2%
Centrally Planned	638	909	2.3%
Total World	612	706	0.9%

note: unit count represents lb per capita
source: USDA, FAO

Land In Crops Around The World

Type Of Countries	1961-1965	1978	% Increase	Potential Cropland
Developed	379	394	4%	410
Third World	562	630	12%	1800
Centrally Planned	392	390	—	540
Total World	1333	1414	6%	2750

note: unit count represents millions of hectares
source: USDA, FAO

In addition to the use of electronics to contend with problems of unproductive wheel tractor slippage, industry designers apparently are re-examining the use of materials in the powerplant's combustion process to improve fuel efficiency.

"Ideally," IH's Potter pointed out, "diesel engines should burn up all flammable material in the fuel for optimum efficiency—don't blow any hydrocarbons out of the exhaust. To accomplish this, the engine should operate at higher temperature and pressure within the block." One of the design tradeoffs, however, is higher NOx.

"There are a lot of people in this industry, including ourselves [Harvester], looking at substitute materials to allow the engine to efficiently operate at higher temperatures," he said. "Ceramic material is one of them."

Massey's Ramsay added, "What we'll be looking at are items like ceramic inserts for valve seats—high temperature areas of the engine subject to heat erosion. I doubt if we'll see ceramics used to line an engine block."

Materials changes in the combustion process must strike a balance between cost and performance. Yet the combustion chamber in a direct injection diesel engine can undergo inexpensive redesign. "You can modify the bowl in the top of the piston without a great deal of change, to improve performance," Brumbaugh emphasized.

"But when it comes to indirect injection engines which operate at higher speeds, a change in basic cylinder head design is needed. It requires a change in machine tooling at the manufacturing level. That's expensive."

Ford's Howard apparently agreed. "We'll be changing the intake and exhaust ports in the heads of our direct injection diesel engines. But this industry evolution will be slow, finding an appropriate combination of compression ratio, swirl characteristics and valve ports for proper fuel efficient performance."

Massey already has developed a squish lip system that essentially consits of a tapered hole in the top of a piston. The hole is slightly smaller than the diameter of the bowl as the hole descends into the piston. "It's leading to additional fuel efficiency in our Perkins diesels," Massey's chief designer claimed.

"The engine itself needs more innovative development," he added. "There are alternatives to diesel fuel. Oil can be extracted from plants and subjected to a fairly simple chemical process to change the nature of the fuel, getting rid of gums."

He indicated that these experiments with alternate, multiple fuels are still in early developmental status. "We [Massey] still have some problems of gumming up injectors. And we're still not sure what the long-term impact will be on the fuel pump itself. But the engine will run on these fuels."

"The strategy we're looking at," IH's Potter said, "is the use of biomass [green crops that produce cellulose via the process of photosynthesis]. That cellulose can be converted to a synthetic gas comprised of methane, hydrogen and carbon monoxide. Synthetic gas, in turn, can be converted to a liquid fuel for farm tractor operation in the same environment."

This may offer remote farming communities in the third world and elsewhere an opportunity to become self-sufficient in the production of alternative fuels.

However, land management will become more and more important. Farmers may be trading off acreage for more frequent plantings. According to Ford's Lamp, "Management of time becomes crucial. It increases the use factor of farm machines. And more intensive use of land may reverse the trend toward higher horsepower tractors."

It appears that man and machine are inseparable in a common goal to ease world hunger. As Chilean poet, Pablo Neruda, wrote of his fellow patriots:

He was yellow harvesting wheat.
He was black deep in the mine.
He was stone-colored in the castle;
in the fishing boat
the color of tunny;
horse-colored in the meadow.
How could anyone distinguish him
if they were inseparable:
the element, earth, coal or sea—
in the guise of man. ■

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Off-Highway Industries has learned that high interest rates continue to chip away at retail sales of farm tractors and combines, except for Japanese 2WDs under 40 hp, while a glut of inventories mount at retail outlets throughout the US.

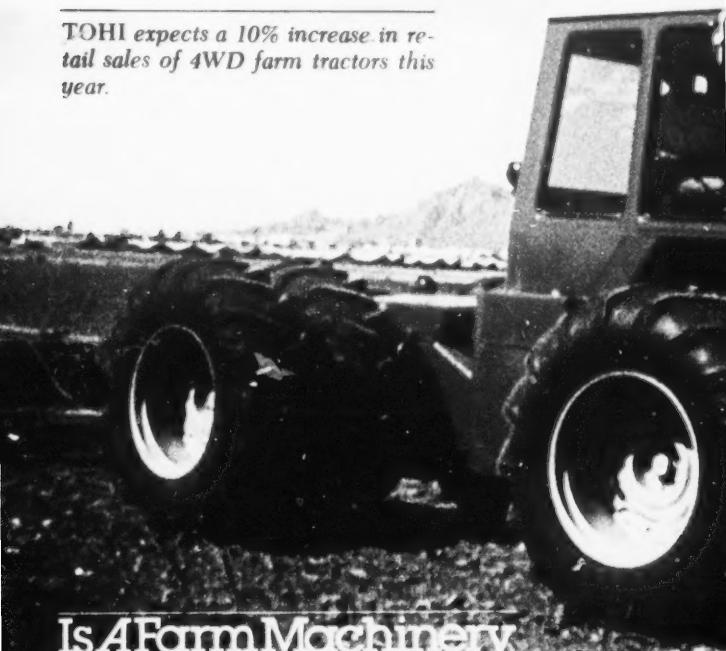
Retail sales of self-propelled farm machinery fell by 13% during the first six months of this year. A closer look shows that sales actually dropped by 100 units to 630 vehicles daily. But farm OEMs failed to offset this loss of business at the factory.

buildup of inventories industry's pipeline is this in retail sales during the season fails to mater ventories could becom ageable, forcing manuf lower inventories to six- els via competitive pricin

The reason for the OE maintain vehicle stockp months supply is simple. clear the deck for entry o tractors and combines March-April-May spring son.

Most producers of far

TOHI *expects a 10% increase in retail sales of 4WD farm tractors this year.*



Is A Farm Machinery

TURNAR ATHA

Huge inventories and falling retail s and combines stalk domestic OEM jump into the fall harvest selling se turnaround be at h

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Some of these producers are John Deere, International Harvester and Ford. All three of them plan to introduce various new models of two- and four-wheel-drive farm tractors to the domestic marketplace later this month. Others will follow suit next spring.

John Deere, the largest retailer of farm tractors in the nation with about 25% of the business, reportedly is on the verge of unveiling one new model in a new 50-Series 2WD and 4WD farm tractor family this fall. Preliminary reports in-

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Farm Machinery

dicate it (model 88-50) could be rated at 250 PTO hp with four wheel drive. Pilot production is underway at Waterloo, IA. Other 2WD and 4WD counterparts probably will bow next spring.

Ford, the second largest seller of tractors with nearly 17% share of the domestic market, confirmed that it already has started pilot production of 10 models of a new Series-10 2WD farm tractor family at Romeo, MI. Final production is set for October for the 30-90 hp buggies.

International Harvester, the third biggest marketer of farm tractors with more than 15% of the nation's business, supposedly has been engaged in retooling its Rock Island, IL production complex to begin pilot output of an all-new, four-model family of 88-Series 2WD farm tractors. The 105-160 PTO hp lineup could bow later this month.

At the other end of the farm tractor spectrum, Canada-based Versatile reportedly will yank the wraps from its largest, top-of-the-line 4WD tractor, a 400 engine hp model, later this fall.

It's expected that John Deere will follow up introduction of its new 50-Series 2WD and 4WD farm tractor family with a new rotary combine next spring, along with possibly similar items from Massey-Ferguson, the fifth largest retailer of tractors in the US with about 10% market share.

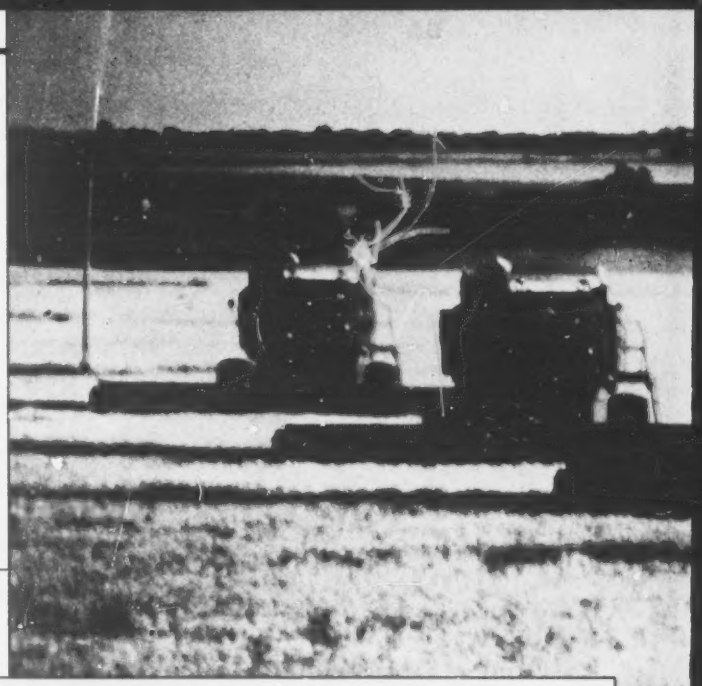
Until then, however, OEMs must clear out large amounts of vehicle inventories via improved retail sales, lower build rates or both, to make way for the new high-volume models of farm machinery.

According to an exclusive composite recently developed by *TOHI*, farm OEMs will be lucky if retail sales of vehicles break even with last year's domestic performance. Nonetheless, there's still hope for a turnaround at the marketplace by roughly 3½%, to 198,500 units in 1981. It trails a 13% slump last year.

The reason for this year's expected modest upturn in business, especially in light of current high interest rates and a sluggish economy, is the Reagan administration's axing of the nation's grain embargo with the Soviet Union. It frees domestic corn and soybean output for possible purchase later this year by the Russians, driving up prices for grain which, in turn, bolsters farm income and tempts users to purchase newer capital equipment like tractors and combines.

Also, a primary grain producing portion of Red China cropland suffered a massive drought as other parts of the populus nation waded through massive record rain floods. It's likely to instigate large purchases of domestic wheat from the

Due to the overriding impact of farm cash receipts and planted acreage on actual demand for large machinery, an upturn is anticipated this year.



Farm Machinery Inventory High

	1979		1980		May, 1981	
	Units	Days' Supply	Units	Days' Supply	Units	Days' Supply
0-39 HP	41,500	301	34,500	266	33,900	365
40-99 HP	33,400	177	37,300	236	36,700	241
100 HP & More	27,200	159	23,900	173	30,000	231
All 2WDs	102,100	211	95,700	225	100,600	242
All 4WDs	6,100	194	7,000	236	8,000	252
Total Tractors	108,200	210	102,700	226	108,600	233
All Combines	7,300	83	10,600	151	16,700	234
Grand Total	115,500	191	113,300	216	125,300	258

NOTE: Units Represent Actual Inventory Count At All Domestic Outlets, Except Kubota
SOURCE: Truck & Off-Highway Industries Data

Retail Sales In First Half

	1979		1980		6 Mos., 1981	
	Units	Daily Sales	Units	Daily Sales	Units	Daily Sales
0-39 HP	49,300	200	46,800	190	24,200	197
40-99 HP	65,000	264	58,100	236	26,800	218
100 HP & More	62,500	254	50,300	205	20,100	163
All 2WDs	176,800	719	155,200	631	71,100	578
All 4WDs	11,500	47	10,900	44	4,700	39
Total Tractors	188,300	765	166,100	675	75,800	617
All Combines	32,200	131	25,700	105	7,700	63
Grand Total	220,500	896	191,800	780	83,500	680

NOTE: Units Represent Actual Retail Sales At Domestic Outlets
SOURCE: Truck & Off-Highway Industries Data

Farm Tractor Leadership At A Glance

	1980		1979	
	Units	% Total	Units	% Total
John Deere	41,300	25%	46,300	24½%
Ford	28,250	17%	29,150	15½%
Int'l Harvester	25,000	15%	35,100	18½%
Kubota	17,100	10%	20,900	11%
Massey-Ferguson	17,000	10%	17,500	9%
J. I. Case	12,100	7%	11,300	6%
Allis-Chalmers	10,550	6%	10,300	5½%
White	4,900	3%	7,350	4%
Deutz	2,400	1½%	—	—
Versatile	1,400	1%	1,400	1%
Steiger	1,100	1%	1,600	1%
Others	5,000	3½%	7,400	4%

NOTE: Units Represent U.S. Retail Sales
SOURCE: Truck & Off-Highway Industries Data

Japan Tops Tractor Imports

	1980	% Total	1979	% Total
Japan	42,600	55%	64,000	65%
United Kingdom	12,800	16½%	12,200	12½%
West Germany	12,200	16%	12,900	13%
Romania	4,200	5½%	3,900	4%
Italy	2,500	3½%	2,100	2%
Canada	1,300	2%	2,000	2%
Soviet Union	450	1%	200	1%
Others	150	—	100	—
Total	76,200		97,400	

NOTE: Factory Shipment To The U.S.
SOURCE: Truck & Off-Highway Industries Data

Detailing Tractors From Europe

	1980		1979	
Manufacturer	Units	% Total	Units	% Total
John Deere	9,700	37%	11,200	39%
Int'l Harvester	7,700	30%	8,400	30%
Case/David Brown	4,000	15%	4,000	14%
Deutz	2,700	10%	2,300	8%
Same	750	3%	700	3%
Massey-Ferguson	700	3%	500	2%
Daimler-Benz	50	—	9	—
County	20	—	19	—
Others	380	2%	1,092	4%

NOTE: Units Represent U.S. Retail Sales By Calendar Year
SOURCE: Truck & Off-Highway Industries Data

Detailing Japan's Share Of Market

	1980		1979	
Manufacturer	Units	% Total	Units	% Total
Kubota	17,000	40%	17,600	43½%
Ford/Shibaura	10,000	23½%	8,100	20%
John Deere/Yanmar	7,000	16½%	4,600	11%
Massey-Ferguson/ Toyosha	2,500	6%	1,700	4%
Allis-Chalmers/ Toyosha	2,000	5%	2,200	5%
Int'l Harvester/ Komatsu	1,000	2%	1,200	3%
White/Iseki	1,000	2%	850	2%
Others	2,050	5%	4,150	11½%

NOTE: Units Represent U.S. Retail Sales By Calendar Year
SOURCE: Truck & Off-Highway Industries Data

Farm Machinery

US later this year, for the second year in a row.

If and when these back-to-back developments gel, they probably will spur much higher prices for bushels of US grain, lead to double-cropping and perhaps open up new markets to North American manufacturers of self-propelled combines and 4WD farm tractors.

International Harvester's T. L. Dougherty, senior vice president-general manager, North American Operations, said that low reserves of grain, as is the case in the US at present, generally tend to increase commodity prices and accelerate turnover of farm machinery.

Yet big advances in commodity prices haven't happened, Dougherty explained. "Prices haven't recovered since Carter ordered the grain embargo with the Soviet Union. So the outcome of the now-defunct embargo is still hazy.

"Coupled with today's high rates for financing new equipment, many farmers find it too costly to carry inventory and delay purchase of farm equipment," he added. Ford's H. J. Head, general operations manager-North America, and others agreed.

Fortunately one favorable factor looms. The Reagan administration proposes to accelerate depreciation of capital-intensive farm equipment financed by farm operators. The current 10-year timetable could be slashed to just 5 years.

Various farm equipment manufacturers view the Reagan proposal (known formerly as the Capital Cost Recovery Act, or "10-5-3") as primarily beneficial to larger business outfits. Nonetheless, "10-5-3" should hasten turnover of farm tractors and combines by roughly 25% to a 5-6 year cycle.

Ford's H. J. Head reported that there appears to be "a temporary decrease in the number of farm tractors traded in on new purchases," implying that downsizing in hp of 4WDs and 2WDs for more proper matching of horsepower to the job may be in the works. It could be the beginning of a new trend towards lower horsepower in the farm machinery business.

Time will definitely be decisive for the US Dept of Agriculture's current outlook on domestic farm cash receipts (gross income) of $162 billion and net farm income of $29 billion in 1981. They represent advances of 15% and 17% respectively, just exceeding the annual inflationary pace.

USDA offers similar forecasts for domestic acreage planted. Corn, for example, may nudge the 85 million mark this year. Wheat could exceed 84 million acres. And soybeans will likely exceed 70.5 million planted units. This represents hikes of just 2%, 4% and less than 1% respectively, compared to 1980 results.

Due to the overriding impact of farm cash receipts and planted acreage on actual demand for large machinery like self-propelled combines and 4WD farm tractors, an upturn is anticipated this year.

Ford's Head, Harvester's Dougherty, Allis-Chalmers' executive vice president Roy Uelner, and others expect retail sales of combines to increase by 10-15% while high-horsepower 4WDs show slower growth of 0-11%.

As a result, *TOHI* expects an increase of 12% to 28,800 retail sales of combines in the US during 1981, and a 10% hike to 11,990 units of 4WDs.

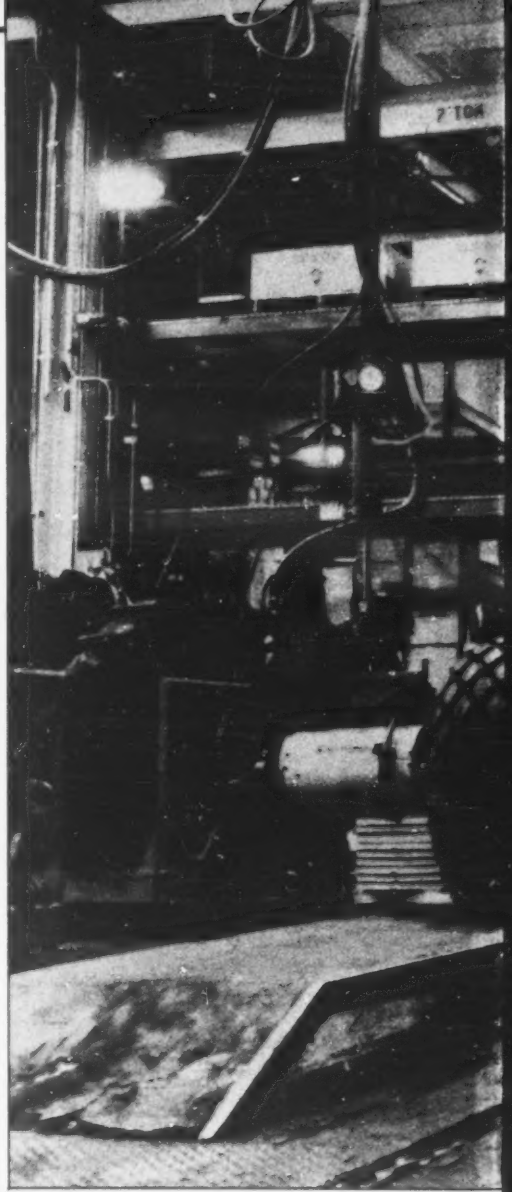
The outlook for 2WD farm tractors above and below 100 hp isn't as rosy due to near-term trends in commodity prices and livestock population.

Ford and Harvester both foresee a wide range of year-end finales from 0-10% growth in North American retail sales of all 2WDs. Subsequently, we estimate flat business of 104,900 sales of vehicles below 100 hp and a 5% advance to 52,800 units of machines above 100 hp in the US during 1981.

This year obviously is shaping up to be a relatively flat business period with the potential for a turnaround during the fourth quarter. "We expect OEMs will search for programs that will help ease buyer reluctance of farm equipment purchase at current high interest rates," Ford's Head remarked.

"Most OEMs are concerned about increasing production schedules of tractors and combines to build inventories and capitalize on a major turnaround during the latter part of the year. But interest rates may tumble."

If the rates *do* decrease it could ignite the marketplace and substantially reduce vehicle inventories, boosting production schedules for new 2WD and 4WD farm tractors at the factory. ■



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Two-wheel-drive farm tractor daily sales have sunk to 578 units in the first six months of this year. Nonetheless, there's still hope for a 3½% turnaround.

2Wd Farm Tractor Sales By Company (Below 40 HP)

	1980		1979	
	Units	% Total	Units	% Total
Kubota	14,500	31%	19,200	39%
Ford	12,200	26%	8,900	18%
John Deere	7,000	15%	4,900	10%
Massey-Ferguson	4,700	10%	1,700	3½%
Int'l Harvester	2,600	5½%	6,400	13%
Allis-Chalmers	2,100	4½%	2,500	5%
White	700	1½%	750	1½%
Others	3,000	6½%	4,950	10%

NOTE: Units Represent U.S. Retail Sales
SOURCE: Truck & Off-Highway Industries Data

Self-Propelled Combine Sales By Company

	1980		1979	
	Units	% Total	Units	% Total
John Deere	10,300	40%	11,300	35%
Int'l Harvester	4,400	17%	4,200	13%
Allis-Chalmers	4,400	17%	5,200	16%
Massey-Ferguson	3,600	14%	5,800	18%
Sperry-New Holland	1,700	6½%	1,600	5%
White	1,000	4%	1,100	3½%
Ford	100	½%	1,100	3½%
C[illegible]ian Cooperative	100	½%	950	3%
A[illegible]o-New Idea	100	½%	950	3%

NOTE: Units Represent U.S. Retail Sales
SOURCE: Truck & Off-Highway Industries Data

2WD Farm Tractor Sales By Company (40-99 HP)

	1980		1979	
	Units	% Total	Units	% Total
John Deere	13,400	23%	14,300	22%
Ford	13,400	23%	16,600	25½%
Massey-Ferguson	9,300	16%	13,000	20%
Int'l Harvester	7,600	13%	9,100	14%
J.I. Case	3,500	6%	3,300	5%
Allis-Chalmers	2,900	5%	2,600	4%
Kubota	2,600	4½%	1,700	2½%
White	2,300	4%	2,300	3½%
Deutz	1,400	2½%	—	—
Others	1,700	3%	2,100	3½%

NOTE: Units Represent U.S. Retail Sales
SOURCE: Truck & Off-Highway Industries Data

4WD Farm Tractor Sales By Company

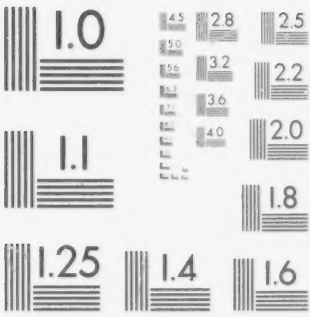
	1980		1979	
	Units	% Total	Units	% Total
Int'l Harvester	3,200	29%	2,400	20½%
John Deere	2,000	18%	2,700	23½%
J. I. Case	1,800	16½%	1,700	15%
Versatile	1,400	13%	1,400	12%
Steiger	1,100	10½%	1,600	14%
Allis-Chalmers	550	5%	500	4½%
Massey-Ferguson	500	4½%	300	2½%
Ford	150	1½%	250	2%
White	100	1%	600	5%
Others	100	1%	50	1%

NOTE: Units Represent U.S. Retail Sales
SOURCE: Truck & Off-Highway Industries Data

2WD Farm Tractor Sales By Company (100 HP & More)

	1980		1979	
	Units	% Total	Units	% Total
John Deere	18,900	37½%	24,400	39%
Int'l Harvester	11,600	23%	17,200	27½
J. I. Case	6,800	13½%	6,300	10%
Allis-Chalmers	5,000	10%	4,700	7½%
Massey-Ferguson	2,500	5%	2,500	4%
Ford	2,500	5%	3,400	5½%
White	1,800	3½%	3,700	6%
Deutz	1,000	2%	—	—
Others	200	½%	300	½%

NOTE: Units Represent U.S. Retail Sales
SOURCE: Truck & Off-Highway Industries Data



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